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NAME OF AUTHOR/*NOM DE L'AUTEUR* LORNE LESLIE NEIL EVERNDEN

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NAME OF SUPERVISOR/*NOM DU DIRECTEUR DE THÈSE* PROF. W. A. FULLER

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THE UNIVERSITY OF ALBERTA

"ECOLOGICAL AESTHETICS": A CRITICAL DISCUSSION

by

LORNE LESLIE NEIL EVERNDEN ©

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
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DEPARTMENT OF ZOOLOGY

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THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "'Ecological Aesthetics': a Critical Discussion" submitted by Lorne Leslie Neil Evernden in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

Supervisor

Allen Carlson

External Examiner

Date April 22, 1976

All science should be scholarly, but not all scholarship can be rigorously scientific. . . . The terrae incognitae of the periphery contain fertile ground awaiting cultivation with the tools and in the spirit of the humanities.

John Kirtland Wright,
cited by Yi-Fu Tuan,
Topophilia

ABSTRACT

Current interest in environmental problems has led researchers to attempt to quantify the aesthetic merit of landscape. This study examines that attempt, and presents a simple method of evaluation. Through the use of the four factors found to be most important in landscape preferences--landform, wildness, degree of "focal" composition and degree of "feature" composition--a predictive "index" is derived. However, this study also questions the validity of assumptions underlying current research, and suggests that there may be unfavourable consequences to the use of the proposed systems of evaluation. It examines the aesthetic theory tacitly accepted by current researchers to see how it compares with opposing views, and discusses the influence of landscape painting in determining current preferences. Finally, some alternative assumptions are entertained in the hope they may lead to a more fruitful and ecologically provident approach to the appreciation of natural lands.

PREFACE

PREFACE

It might not be immediately obvious that consideration of the aesthetic appreciation of nature is a problem in human ecology. But Paul Shepard's observation that ". . . the central problem of human ecology may be characterized as the relationship of mind to nature" indicates that it is. For the very act of regarding nature as an object of aesthetic interest demands a certain set of assumptions, one that has not been universally embraced.

The following discussion is not an attempt to give a definitive proposal as to how aesthetic excellence in nature can be quantitatively determined, although this possibility demands a considerable portion of the text. Neither is it a philosophical attempt to show how the aesthetic appreciation of nature fits into the study of aesthetics proper, although again, aesthetic theories must obviously occupy the attention of anyone addressing himself to the concept of "natural beauty".

Rather, this study aspires to a re-evaluation of the approaches to landscape aesthetics now in vogue and of their probable ecological consequences. It's aim of broadening the base upon which future studies might stand entails the juxtaposition of views from many disciplines (to which the ample use of citation will attest), views which might normally be altogether allopatric.

Given the emphasis upon drawing together diverse viewpoints--which the author regards as a prime function of interdisciplinary studies--it is inevitable that he overstep the bounds of his competence. This no doubt causes him to ignore many subtleties that might profitably be examined, but if the study succeeds in stimulating further work these will no doubt be elaborated in due course. At this stage it seems appropriate to aim at a general statement of the problem and of the potential contributions of several disciplines to what may prove an important facet of human ecology.

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TABLE OF CONTENTS

Page

Introduction 1

1. - The Quantification of Landscape Beauty. . 14

2. - Basic Assumptions 40

3. - The Revelation of Landscape 69

4. - The Invention of Distance 90

5. - A Possible Resolution 111

6. - Conclusion 132

Literature Cited 139

Appendix A - Details of Empirical Studies. . . 148

Appendix B - Examples of Scenes Used 183

LIST OF TABLES

Table | Page
1. - Classification of factors suspected of being important to landscape aesthetics 33
2. - Correlation of landscape factors with test group preferences 37
3. - Set of aesthetic and non-aesthetic adjectives 47
4. - Differences in mean ratings assigned to slides of the same landscape in differing atmospheric conditions 62
5. - Correlation of landscape factors with test group preferences for mountain scenes 64
6. - Correlation of expert ratings with test group ratings 87

LIST OF ILLUSTRATIONS

Page
Figure 1 79
Figure 2 79
Figure 3 81
Figure 4 81
Figure 5 81

INTRODUCTION

Introduction

> . . . with the exception of love, there is perhaps nothing else by which people of all kinds are more united than by their pleasure in a good view.
>
> Kenneth Clark, *Landscape into Art*

This statement of Clark's is one with which most of us would be inclined to agree. But it is not obvious why landscape should be universally admired, or what exactly is meant by "a good view".

Without attempting any definitions, conservationists have long argued for the preservation of natural areas on the basis of intrinsic aesthetic merit. But because these arguments seemed entirely subjective, they seldom carried much weight against the "numerical arguments" (1) of the developer. As Fines observed,

> . . . if subjective judgement is inadmissable then the planner is culpable whenever he delineates an area of great landscape value or refuses planning permission on the grounds of "visible amenity". (2, p.42)

Mounting pressure on remaining natural areas has placed land-use planners in much the same position as conservationists, but the new combatants seem less content to fight a rear-guard action. They are faced with the evidence of public demand for "a good view" but do not wish to advocate any course of action on the basis of subjective arguments alone. Rather, they demand adequate tools with which to assess the attributes of the land they are charged with managing.

> The time has come when the arguments of the environmentalist might best be presented by (1) separating facts from emotions in relation to the environment, and (2) by providing him with a means of quantifying his arguments: using numbers to talk about the landscape. (1, p.37)

To provide numerical evidence for the existence of landscape values, the initial tactic was to attempt to demonstrate that, although certain financial gains could be realized through commercial development of a given tract of land, there could be even greater economic benefit from land left undeveloped. The result, when the argument was successful, was often destructive levels of "non-consumptive" use by thousands of tires and feet. Yet long before the dangers of over-use became apparent, the distinguished American biologist Aldo Leopold had cautioned against this sort of evaluation of natural ecosystems. It is true, he allowed, that certain types of land can be shown to possess attributes so highly regarded by the populace as to make them economically valuable in an undeveloped state. But to adopt such an argument is to restrict oneself to the defence of only one type of natural land. Other ecosystems, whose merits do not find easy expression in economic terms, cannot be defended against development by this means.

> When one of these non-economic categories is threatened, and if we happen to love it, we invent subterfuges to give it economic importance . . . . The evidence has to be economic in order to be valid. (3, p.210)

Not only did this approach fail to explain the value seen by some in non-economic landscapes, it also produced a dangerously simplistic system of evaluation..

> . . . a system of conservation based solely on economic self-interest is hopelessly lopsided. It tends to ignore, and thus eventually eliminate, many elements in the land community that lack commercial value, but that are (as far as we know) essential to its healthy functioning. (3, p.214)

Thus the attempt to "fight fire with fire" led the conservationist into a self-made trap: once he accepted economic arguments, he tacitly accepted economic values and became party to the exclusion of non-economic lands from special consideration. He accepted the reduction of all values to one. Yet to avoid economic evaluation has, in the past, forced the conservationist to depend on subjective and emotional arguments that a contemporary writer has branded as "burdened with sentimentality and impractical attitudes toward natural resource use". (4, p.227)

Having found both argument from economic evaluation (or, more properly, monetary assessment--contemporary economists recognize the existence of other kinds of value (5)) and from emotion to be inadequate, each for quite different reasons, the conservationist and planner continue to search for quantitative tools that will facilitate measurement of a full range of landscape attributes, including those traditionally regarded as intangible. Obviously, a new scale of evaluation would not be able to compete directly with the established monetary scale, since it would speak in different units. And, as the saying has it, apples and oranges are not directly comparable. Yet even if one is accustomed to ascribing unusual importance to oranges, the sight of a large pile of apples on the opposite side of the scales might at least engender some doubts.

In attempting to place a quantitative value on the aesthetic attributes of a landscape, we are attributing to it some measure of substance. It is seen to be a real element in the makeup of the land. In other words, "scenery has become a resource". (6, p.130) And as such, it can and should be treated as any other natural resource, which customarily means being measured and husbanded so as to be of optimal usefulness to society.

> . . . if we are to consider these values in our decision making, we must identify those aspects of scenery which mean something to the broadest range of people. And we must develop evaluative scales that are stable enough to influence a wide range of decisions when we allocate the resources that make a scene. (6, p.130)

Amongst the researchers presently working on the assessment of aesthetic merit in natural areas, the utilitarian attitude embodied in the above quotation is, I think, respected and widely embraced. Furthermore, it seems already to have been accepted as a proper guide for management. A recent publication by a U.S. Government agency advises its personnel that

> the objective of landscape management is to manage all National Forest System lands so as to attain the highest possible visual quality . . .

and that

> . . . visual quality objectives . . . shall be determined from a consideration of the physical characteristics and scenic quality of the land (7, p.2380.4)

In other words scenery is, on the administrative level of government, already viewed as a resource to be measured and managed.

In a 1966 paper, Sargent summarized the position thus:

> Scenery, like other natural resources, can be analyzed, classified, protected, managed, and promoted, and any regional resource development program in an area with great scenic potential must consider that potential (8, p.26)

I wish to point out this agreement amongst administrators and researchers that there is something of aesthetic value in the natural environment and that it can be measured.

Or at least, that environments possessing this value are distinct enough in some physical sense to be quantitatively distinguishable from sites lacking aesthetic value. Given this, there seems no impediment to managing the "visual resources" of natural lands just as one would any other kind of natural resource.

One may, of course, question the underlying goal of utility in this approach, but this is somewhat beyond the scope of the present study. The assumption that beauty is an intrinsic property of some natural objects is not, however, and consideration must be given it in due course. For the time being, the position outlined will be tacitly accepted in order to see where it will lead.

To this point I have referred only to attempts to measure aesthetic merit in the land so as to permit enlightened planning. But another approach to the question of landscape aesthetics promises to provide not simply a planning tool but a compelling argument for the preservation of natural lands of great aesthetic worth. Arguments have been made that suggest that aesthetic values may be not merely desirable, but essential. Natural beauty may not be simply another desirable commodity; it may be something we as a species require. At least, this seems a possible conclusion from a set of provocative theories produced by several writers, most with backgrounds in the biological sciences.

In 1955, Weiss' paper "Beauty and the beast: life and the rule of order" was published. In it, he argued that the recognition of beauty is in fact the recognition of biological well-being.

> For, beauty is order; life is order; hence, life is beauty. It is a syllogism--that simple. (9,p.286)

Weiss attempted to demonstrate his point through a series of examples drawn from art and nature. Objects that we regard as beautiful are, he claims, regular and consistent.

> . . .regularity expressed in such features as symmetry, repetition, and alternation of elements; and consistency, as in the use of curves, proportions, size gradients, and so forth, in subdividing space. In short, we sense the rule of order over randomness, of pattern over chaos, of law over accident.(9, p.286).

Weiss' theory has been elaborated by Meeker and put into terms more suited to a consideration of landscape aesthetics. He observed first that "for Weiss, beauty is a property inherent in things" (10, p.128)--which is, I think, an assumption that most persons attempting to quantify landscape beauty would accept. But he then extended to the living, organized environment Weiss' notion of response to living, organized structures.

> A beautiful landscape is one in which the processes of life, including of course death and pain as well as birth and growth, are provided for in all their complexity. Perhaps there is a common ground between the delight found in temporal art and the stable processes of a biological ecosystem. When we admire a wilderness landscape we are responding to a complex image of processes which are readily associated with human well-being. A burned forest is ugly because it represents a truncated system of growth, but a rich mixture of trees, grass, and wildlife is a working system, that is productively oriented in time. (10, p.129)

This led him to express the hope that, since aesthetic reactions are indicative of ecological well-being, an expansion of aesthetic interest in nature may reinforce ecological arguments, lead to an alteration in basic man-nature relationships, and halt "the long history of destruction our species has caused by its simplistic view of nature". (10, p.134)

Dasmann has expressed a somewhat similar view, with some qualifications (11). All three men possess the credentials and expressive skills prerequisite to the establishment of a credible argument, and the resultant theory provides an interesting embellishment to the topic under consideration. Not only, it would seem, are we engaged in the search for a management tool, but in an investigation of the intuitive recognition of ecological well-being, of a fundamental link between man and his non-human environment. If the aesthetic response to nature is, at bottom, a biological one, there might conceivably be a genuine *requirement* for the aesthetic experience of nature:

It could be that Iltis' concern about the alteration of environments without prior investigation of human needs is well founded, and that the investigation of "ecological aesthetics" has theoretical as well as pragmatic importance (12). Given this possibility, Clark's observation about the universal value of "a good view" seems to make sense. It makes equally good sense from the slightly different viewpoint of a British geographer, J. Appleton.

Appleton would agree with Weiss and Meeker insomuch as they regard the aesthetic response as a biological phenomenon rather than a strictly cultural one. However, recognition of intrinsic organizational strength is not what he means by aesthetic appreciation. Rather, he maintains that our preferences in landscape stem not only from recognition of optimal environments ("habitat theory", in his terminology), but also, and more importantly, from an ancestral need to "see without being seen". He argues, therefore, that any environment that permits the viewer an extensive view while at the same time offering him some measure of invisibility will evoke a positive response. In this his theory seems similar to Nash's speculations on the evolution of the need to see great distances (14). Appleton does not maintain that our reaction is precisely that of our distant primate ancestors, but rather that the original instinct to seek out an ideal habitat has become elaborated in the expanded neocortex into a different kind of response, which we now call aesthetic. Where our ancestors felt perhaps an inarticulate joy or sense of well-being, we now respond with a sense of aesthetic delight and excitement.

> Habitat theory postulates that aesthetic pleasure in landscape derives from the observer experiencing an environment favourable to the satisfaction of his biological needs. Prospect-refuge theory postulates that, because the ability to see without being seen is an intermediate step in the satisfaction of those needs, the capacity of an environment to ensure the achievement of [this] becomes a more immediate source of aesthetic satisfaction. (13, p.73)

"Prospect" of course refers to sites that permit an extensive view of the surrounding land; "refuge" to those that offer some measure of concealment. Ideally, elements of both types ought to be present. For instance, we can imagine a scene in which a long view into a valley is "framed" by large trees on either side and by an overhanging canopy. The viewer is able to see great distances while having the sensation of being concealed by the surrounding vegetation. Appleton goes to great lengths to show that these elements, in every conceivable mixture, figure largely in present-day tastes and those revealed in the work of landscape painters.

Thus, while the exact definition of the aesthetically desirable in nature is somewhat different in Appleton than in Weiss and Meeker, and his theory rather more fully developed, they agree in a fairly fundamental way about the nature of the aesthetic response and, it may well be, about the actual landscapes that ought to be preferred. I shall want to re-examine these studies at a later point. For the present, what is of interest is the possibility they raise of an argument for preservation based on biological rather than strictly cultural imperatives. An investigation of landscape aesthetics may therefore produce not only a method of evaluating the aesthetic merit of natural lands but also an argument for utilizing that method to ensure the preservation of a needed resource.

These two possibilities--that of a quantitative measurement of aesthetic merit and that of a biological argument for the preservation of natural beauty--provide the motivation for much of current research into landscape aesthetics.

The present study begins with an examination of such research and an attempt to participate in it. Arising from this exercise are some questions about tha validity of the approach, questions somewhat different from those anticipated at the outset, and finally to a consideration of alternative approaches.

1

THE QUANTIFICATION OF LANDSCAPE BEAUTY

At this point, I believe an example of the sort of work being attempted would be instructive. The one I have chosen is a highly-regarded system of measurement devised in 1969 by E. Shafer and his colleagues (15). Since its inception, the senior author has retested it in a different part of the United States, published a joint paper with a colleague in Scotland, and taken steps to test for biases in the basic construction of the system. In short, it is a well-executed study which is still being refined and advocated by its originator. It is conceivable that it might come into common use as a land management tool and is well worth our attention.

As is the case with most such studies, Shafer and his colleagues had to address the problem in two phases. First, they had to determine which landscapes were to be considered aesthetically superior; and then, they had to find measureable items in these landscapes that could be used in the assessment of aesthetic merit in other sites. This sounds at first to be slightly circular, for one might argue that if we can accomplish the first phase we have no need for the second. But the point is that we cannot at the outset determine *quantitatively* which landscapes are aesthetically superior. But that there *is* aesthetic merit in certain landscapes is a given assumption, and that these are recognized by viewers is another. What Shafer and others wish to do is to remove this recognition from the realm of the subjective, even though it means beginning with the subjective. They must first examine a set of landscapes felt to be aesthetically meritorious, and then look for common features which will enable them to recognize superior landscapes more objectively.

The exact procedure by which Shafer endeavoured to achieve this is as follows. After assembling a set of 100 black-and-white 8x10 inch photographs representing diverse types of landscape, he solicited the opinions of a number of recreationists. To facilitate this, the set of 100 prints was divided into twenty packets of five, and four such packets were shown to each of 250 participants. Each judge was asked to arrange the five photographs in order of preference. After five subjects had been approached (and the full set of 100 photographs therefore examined), the set was again sorted into groups of five and the process repeated. When all the judges had completed their task, a sum of the rank numbers assigned by the whole panel could be calculated for each photograph.

One that had been ranked first by all participants who saw it (remember that each judge saw only a fifth of the total set) would thus have a value of 50, whereas one consistently ranked fifth would have a value of 250. These would be the theoretical limits of the values the scenes could have, and the lower the number, the greater the supposed merit of the landscape. In actual fact, the range of "Y" values or "aesthetic appeal index numbers" was 71 to 228. Later studies were done either in this manner (16) or by showing viewers only five photographs (two at a time, in all possible combinations) and assembling a rank order to compare with the ranks predicted by the formula described below. (15)

The second step is quantitative analysis of the scenes in question. Shafer identified ten measurable zones in the photographs: sky, immediate-vegetation, intermediate-vegetation, distant-vegetation, immediate-nonvegetation, intermediate-nonvegetation, distant-nonvegetation, stream, waterfall, and lake. These were measured by means of a 1/4 inch plastic grid laid atop the photograph. In addition, he attempted to measure tonal variations of sky, land and water through use of a photometer. Finally all measurements were subjected to factor analysis to select those most likely to provide adequate prediction of the preferences observed in the interviews. Six factors were eventually chosen for use in multiple regression analysis, and from that proceedure the following formula was obtained.

$$\begin{aligned} Y^* = {} & 184.8 - 0.5436\ X_1 - 0.09298\ X_2 + 0.002069\ (X_1 . X_3) \\ & + 0.0005538\ (X_1 . X_4) - 0.002596\ (X_3 . X_5) \\ & + 0.001634\ (X_2 . X_6) - 0.008441\ (X_4 . X_6) \\ & - 0.0004131\ (X_4 . X_5) + 0.0006666\ X_1^2 + 0.0001327\ X_5^2 \end{aligned}$$

where X_1 = perimeter of immediate vegetation

X_2 = perimeter of intermediate vegetation

X_3 = perimeter of distant vegetation

X_4 = area of intermediate vegetation

X_5 = area of any kind of water

X_6 = area of distant nonvegetation

By the use of this formula, the Y values calculated ranged from 84 to 236 and explained 66% of the variance in scores. The suggestion is that this formula can be used to compute objectively the aesthetic merit of any landscape; the lower the value of Y, the greater the aesthetic value of the landscape in question.

Subsequent use of this procedure by Shafer and his colleagues continues to produce impressive correlations between predicted and observed ratings (16). However, Shafer freely admits that what is being tested is preference for photographs, and for black-and-white photographs at that. It does seem probable though that there is some relationship between what a person finds attractive in a landscape photograph and what he finds attractive in landscape proper. Two minor efforts at demonstrating this have given positive results (17,18). Shafer's promotion of this method therefore seems justifiable, although certainly not beyond criticism (19).

Proliferation of many different predictive systems has provoked Fabos (20) to urge that existing systems be tested before still others are propagated. This suggestion seems not unreasonable, and accordingly I applied the Shafer method to a local situation, as closely as circumstances would allow. Where modification was necessary, assistance was drawn from other knowledgeable researchers, notably Litton (21), Craik (22) and Coughlin and Goldstein (23).

Shafer resorted to black-and-white prints so that testing could be done out of doors. However, since access to large groups of recreationists was not possible in this study*, there was no need to use this less than realistic medium; instead, coloured transparencies were used. Additionally, since groups were to be tested together, the ranking procedure was replaced by a rating system identical to that used by Craik and by Coughlin and Goldstein. That is, rather than arranging small groups of photographs in order of preference, the subjects were asked to assign a numerical value to each scene to indicate the level of attractiveness they felt it attained. They were allowed to assign a value from one (very unattractive) to seven (very attractive) to a series of 80 transparencies taken throughout the province of Alberta. The landscapes photographed ranged from flat prairie to the Rocky Mountains, from agricultural land to National Park preserves. Since it was intended that subjects express a preference for whole areas of land, photographs were taken so as to give as realistic a view as possible. That is, no deliberate attempt at composition was made, although of course, the nature of the medium does impose a frame around the scene. But in each case the viewer was able to see from foreground to background and sky; there

* In the area in which the work was done, the National Parks afford the only large concentration of recreationists. Two refusals by the Parks branch to permit this research forced adoption of the alternative system of study.

were no "close-up" photographs which, in a sense, impose the photographer's view on the subject who might notice something quite different if he were on the scene. Shafer has recognized this problem and recommended that close-up or, in his terminology, "micro environments" not be mixed with general "macro environment" photographs (24). Judging from examples given, the categories were mixed in Shafer's earliest work.

The exact test procedure followed* resembles that described by Craik (22). Paid volunteers were recruited through advertisements posted at the University of Alberta. Subjects were able to select from twelve test sessions arranged throughout the winter of 1973-74. Early test sessions were well attended, with numbers declining steadily until virtually no volunteers could be obtained. The total group tested consisted of 61 individuals, 32 men and 29 women, ranging in age from 18 to 34 years (mean age = 22.2). Most of the respondents were university students, with a wide range of interests.

At the beginning of each test session, the purpose of the research was explained and subjects were asked to imagine themselves actually at the sites depicted by the transparencies. They were cautioned to assess the scene itself, not the photograph, and told to indicate their assessment of the scene's attractiveness on a scale of one to seven.

* All experimental work is described in greater detail in Appendix A.

They were also asked to record first impressions, a request which was enforced by a fairly rapid pace of slide change (approximately once every five seconds). The only noteworthy deviation from Craik's procedure was omission of the word "aesthetic" from the instructions given the subjects, for reasons which will become obvious. Slides were shown in a room equipped with a rear projection screen, so as to eliminate the threat of distraction due to projector noise. The room lighting was rheostatically controlled, permitting the selection of a light level congenial both to viewing and to recording ratings. After all 80 slides had been so rated, the subjects were set to other tasks reported below. After about one hour, they were again shown the entire set of slides so that some check could be made on the consistency of their ratings. Since the correlation between first and second runs was high (Pearson's $r = 0.9855$), we may presume the subjects were fairly consistent in their preferences.

Mean values were calculated for each of the test slides and, to be certain these had meaning, analysis of variance was done to ascertain the level of agreement among judges. As had been found in earlier studies (15,22,23,25), there was a high level of agreement--so high in fact ($p < .00005$) as to make the background material, collected in expectation of differences, almost useless.

It appears, therefore, that we do have valid test group preferences and that it does make sense to carry on in the attempt to predict these preferences through the Shafer method. That is, since we know we have agreement from this test group that some scenes are more attractive than others, the Shafer formula, if it is reliable, ought to be able to predict those preferences.

The measurements to be used in the Shafer formula must be calculated from photographic prints. Accordingly, it was necessary to make negatives and then prints from each of the 80 slides. This introduces one slight irregularity: Shafer used 8x10 inch prints, but a full 35mm frame enlarges to about 7x10 inches. To see if this would be likely to influence the results, ten of the slides were enlarged to the full 8x10 inch size at the expense of a bit of marginal detail. No substantial changes in calculated values were observed. Furthermore, since Shafer uses both horizontally and vertically composed photographs even though it is obvious that a vertical one will contain a relatively greater proportion of foreground and/or background than will a horizontally composed photograph of the same scene, he apparently feels the system is robust enough to allow for some irregularity.

There are at least two obvious ways in which to test for correlation between the predictions derived from the Shafer formula and the preferences expressed by the test group. The scenes can be arranged in a rank order from the mean ratings and the correlation tested by a Spearman's rank test. Or, since there are actual values attached to each scene rather than just a rank position, the more commonly used Pearson's product-moment correlation can be used. For the sake of initial comparison with Shafer's work, a rank test was done. Thereafter, all correlations were done by the Pearson method*.

The Spearman's test indicates a correlation of -0.6952 (p<.001) between the predicted and observed ranks. The Pearson's method gives a correlation coefficient (r) of -0.3182 (p=.002). It would appear then that Shafer's formula is applicable to the test conducted in Edmonton, and the method quite as good as earlier papers indicate. One would be inclined to agree with Shafer that "the model can be used by regional planners throughout the United States to help evaluate and compare quantitatively the aesthetic quality of different landscapes" (24,p.1). Apparently we should add that it is also relevant to Canada.

* whether these ratings constitute interval-level data is a disputable point; accordingly, rank-order correlations were also done and are included in Appendix A.

There are, however, a few questions concerning the Shafer method that deserve mention in a study of this type. In the first place, there is the question of correlation statistics. Correlations which are significant at the 99% level and beyond sound extremely impressive, particularly to an uncritical audience, but they do not guarantee accurate prediction of individual cases (see Figs. 1 to 6, Appendix A). With that kind of correlation, for instance, one would not expect that the scene most preferred by the test group would have been predicted by the Shafer formula to rank 39th. All that is being tested for is a general trend, and in general the Shafer predictions and the actual rank order are in agreement. But this doesn't *explain* anything. It confirms that there is agreement, but not that we have solved any mystery. As Garrett Hardin has put it, correlation is the weakest weapon in the arsenal of science--it proves nothing, only shows where the problem lies (26). What I am suggesting is that there is no understanding of the aesthetic response to nature implied in a high correlation between the actual and predicted rank orders. Shafer has not endeavoured to discover the nature of the process, but rather to find a tool to predict preferences. In this he appears successful. However, since there are no actual hypotheses involved, the chance of a spurious correlation, or at least of one that seems to tell more than it actually does, is high.

Shafer's has been strictly a "how" question, with the "why" ignored. Even the elements used in the formula were selected through factor analysis (despite "the well-known phenomenon of factor-analytic research producing factors overly unique to the particular display presented, population sampled, and so forth" (19, p. 488)). The researchers were thus relieved of the necessity of hypothesizing about what features of the landscape may be important in the aesthetic reaction to nature and were able instead to use whatever is easily measured on a photographic print.

Shafer would probably protest that it was not his intention to explain the reaction, only to procure a workable method of quantifying the aesthetic merit of landscapes. Why it works is immaterial so long as it does work. Given this objective, there seem no grounds for complaint. But it does beg the question so far as the present study is concerned, and might even be a questionable procedure in the production of a management tool.

Shafer might also wish to refute the suggestion that the study does not indicate which elements are important to the aesthetic reaction, since the factors selected are, in a sense, hypotheses tested and supported. He asks "is the perimeter of immediate vegetation involved in landscape preferences?", and the statistical response is that it probably is. The difficulty lies in the fact that all the measurements made, all the hypotheses if you like, involve photographic parameters rather than actual landscape features. This compounds the problem raised by the use of photographs, for not only is it photographs that preferences are being solicited for, but it is features of photographs that are being used to explain those preferences and, by extrapolation, the preferences for the landscapes themselves. To the question "what landscape features influence aesthetic preference" the best that can be said is "the areas and perimeters of certain features on photographs of landscape". We still cannot say what features of the *land* are involved, except in a very indirect way.

If we are interested in the man-land relationship, we must then try to re-interpret Shafer's results. For instance, if we consider two landscapes with an equal distribution of vegetation and non-vegetation, it is obvious that the actual values calculated would be quite different if one of them rose in elevation from foreground to background, or vice versa. Because this scene is "tilted up" the viewer and the camera can see a greater proportion of the distant features. It is conceivable, therefore, that what the Shafer method does is demonstrate a preference for scenes with high relief. The possibility seems susceptible to a simple test.

Borrowing from the Litton (20) and Craik (22) approach of classifying the various features of landscapes, we can place the scenes in question on a relief gradient and then hypothesize that high relief will be correlated with high preference ratings. The scenes can be categorized thus:

1. - completely flat land
2. - flat, but with slight irregularities
3. - gently rolling land
4. - dominated by hills; foothill country
5. - mountains

When this prediction is tested we find even higher correlation than that obtained with the Shafer method (r = 0.7552, p<.001 as compared with r = -0.3182, p=.002). This is not to suggest that a simple classification of landform must therefore be considered an adequate substitute for Shafer's or any other predictive system. What I do wish to suggest is that it is difficult to evaluate properly the merits of any system when it is not clear what it is telling us or why it works. The Shafer formula seems to detect some significant element common to landscape photographs that elicit positive reactions from viewers. Yet when we ask what it actually tells us about human preferences in natural landscape, we might conceivably have to conclude that it tells us that people prefer mountains to prairies. To be useful, a predictive system ought to allow us at least some discrimination of preferences within similar landforms, but if a comparison is made between values calculated with the Shafer formula and the observed preferences for mountain scenes only (n=36), it loses all predictive ability (Spearmans correlation =-0.1524; Pearsons r=-0.1274). As one would expect, a partial correlation controlling for landform shows that the predictive value of the Shafer calculation drops considerably (see Appendix A.) One is forced to conclude either that the procedure followed in the test described is simply too different from the one used by Shafer, or that the Shafer method does not give as much information about aesthetic preferences in landscapes as one might hope.

If we are forced to search for an improved predictive tool, where ought we to look? Certainly Shafer's methodology is not open to serious criticism except perhaps on the level alluded to earlier, that his rather Baconian avoidance of hypotheses can lead to spurious correlations, and almost of necessity, leaves us in ignorance of the process we are studying. Fabos has expressed disapproval of the fact that, in many studies, "the majority of the variables used were selected intuitively" (20,p.50); one wonders where he imagines hypotheses are conceived. But to eschew hypothesis, though perhaps necessary in some instances, is to fly in the face of contemporary scientific method. A popular treatment of the philosophy of science observes that

> In sum the maxim that data should be gathered without guidance by antecedent hypotheses about the connections among the facts under study is self-defeating, and it is certainly not followed in scientific enquiry. On the contrary, tentative hypotheses are needed to give direction to a scientific investigation. Such hypotheses determine, among other things, what data should be collected at a given point in a scientific investigation.(27,p.13)

Therefore my suggestion that it is desirable to test hypotheses about man-landscape interaction rather than to simply look for correlations with formal photographic detail is a far from radical proposition. Fortunately, other researchers have not been reluctant to speculate about the importance of various elements in landscape appreciation, even though many of them also used photographic simulation. The workers mentioned earlier, Litten and Craik, are two cases in point. Litton's principal contribution has been to create a useful system of landscape classification. He pays particular attention to compositional features and viewing conditions, such as "focal" composition (with lines converging toward the centre of the scene) and "feature" composition (with a predominant structure in the scene demanding the viewer's attention) (21). Craik accepted Litton's classification system as a point of departure for his own studies of the human response to scenery. Whereas Litton simply suggested classes into which a landscape might fall, Craik has tried to define them more precisely. For instance, in the case of focal composition he recognized this tendency as being totally absent, partially present, or very obviously present. He thus allowed for intermediate conditions, the lack of which made the Litton system difficult to use at times.

Craik investigated the possible importance of several elements in the landscape. However, in contrast to Shafer he was not primarily interested in developing a predictive tool, but rather in establishing the role of various elements in the aesthetic response to nature. His findings were that focal views and ones that permit the viewer to see a great distance were positively related to preference, and that panoramic scenes and those that contain clouds are also slightly preferred. He concludes that "the emphasis upon distant views is noteworthy" (22, p.303).

Since to all intents and purposes the photographs used in the Edmonton test were all ones which presented the viewer with a distant view, Craik's results are not of great interest here. But the procedure itself is, for with minor modification it can be made to yield a predictive tool as well. All that is needed is numerical values for the categories used that will demonstrate a gradient--from low to high relief, for example. We can then hypothesize that there will be a correlation between the amount of a particular "property" in the landscape and the preferences of the test group. Many of Craik's categories lend themselves to this endeavour; several others, such as landform, seem obvious omissions which should be included. The factors finally selected are listed in Table 1.

The items "observer position", "light angle", "distance", "panorama", "focal composition", and "feature composition" are essentially the same as ones used by Craik. Numerical values attached to the categories are intended to reflect an increase in "amount" of the category in question. The one exception is cloud cover, where it was assumed that the kind of cover is as significant as the amount. All categories are quite easy to become familiar with and use, even at the site itself, since no laborious measurement is involved.

Table 1 - Classification of factors suspected of being important to landscape aesthetics

parameter	categories
landform	1. completely flat land
	2. flat, with slight irregularities
	3. gently rolling land
	4. hilly land; foothills
	5. mountains
wildness	1. strong human effect; tamed
	2. human artifacts intrusive
	3. agricultural, but not much sign of human presence
	4. pastoral - altered but seems natural
	5. wild, but with some human sign (a trail, a post, etc.)
	6. apparently wild land with no sign of human presence
observer position*	0. viewer on same plane as land seen
	2. viewer higher or lower than land
light angle	1. directly overhead (noon)
	2. slight angle (as at 10 AM or 2 PM)
	3. sharp angle (near sunrise or sunset)
distance (extent of view)	1. less than 1/4 mile
	2. 1/4 mile to 3 miles
	3. greater than 3 miles
colour perspective (warm colours in foreground, cool ones in distance to increase sense of distance).*	0. absent
	2. present
cloud cover	1. dismal grey overcast
	2. overcast but bright
	3. clear sky
	4. occasional cloud, or light broken cloud
	5. distinct, white cumulus cloud
	6. dramatic clouds

focal composition	1. definitely absent
	2. somewhat present
	3. definitely present
feature composition	1. definitely absent
	2. somewhat present
	3. definitely present

---

* - "0" and "2" used so that if included in a cumulative index, the effect of the parameter would be more substantial.

It would be possible, but difficult, to make some more exact measurements, which would essentially just put more intervals on the gradient being described. The value of this would be questionable, however, given the inexacteness of the entire endeavour. L.J. Henderson, the noted biologist, is quoted as having said that given five or six variables he might be able to find a solution to a problem, but that given twenty or more he might as well not bother (28, p.13). I suspect his expectations of success in this kind of endeavour would not be high. Also, as noted above, even the kind of evidence being relied upon (correlation) is open to question. Therefore, realizing that we are not dealing with anything approaching an exact science, it seems ill-advised to sacrifice ease of application in an attempt at overly-subtle measurement.

The correlations of the above categories with the actual preferences expressed by the test group are presented in Table 2, along with the proportion of the variance "explained" by each parameter. It is noteworthy that the two most important factors, landform and wildness, are ones that have been identified in more or less similar terms by several other researchers (12, 25, 29, 30).

Finally, a multiple regression using those factors that are individually able to explain over 20% of the variance produced an "index" which has a high correlation with the preferences observed ($r = 0.8207$, $p < .001$) and which explains 67.36% of the variance. The formula for this index is as follows.

$$\text{Index} = 2.00246 + 0.11467\ X_1 + 0.24273\ X_2 + 0.36120\ X_3 + 0.35675\ X_4, \text{ where}$$

X_1 = landform

X_2 = wildness

X_3 = focal composition

X_4 = feature composition

This seems to offer a simple, easily applied and fairly accurate tool for predicting landscape preferences. And, despite the large roles played by landform and wildness in the index, it remains capable of significant discrimination amongst the highly preferred mountain scenes ($r = 0.5511$, $p < .001$). Furthermore, since the index can be said to be based on four hypotheses--that landform, wildness, focal composition and feature composition are involved in the positive reaction to landscape--there is something besides a predictive tool to consider. For now we must try to understand why these particular features should be so highly regarded by the test subjects.

Table 2 - Correlation of landscape factors with test group preferences.

Parameter	*Pearson's r*	*level of significance*	*% variance explained*
landform	0.7552	.001	57.03
wildness	0.7152	.001	51.16
observer position	0.3637	.001	13.23
light angle	0.1318	.122	1.74
distance	-0.0040	.486	0.0
panorama	0.3086	.003	9.52
colour perspective	0.0192	.443	.04
cloud cover	0.0916	.210	.84
focal composition	0.4531	.001	20.53
feature compositon	0.4866	.001	23.68
index	0.8207	.001	67.36

If we wish to discover a biological argument for the preservation of aesthetic resources, as the theories of Weiss, Meeker and Appleton seem to encourage us to do, then we must account for this preference for mountains. It is a preference not only of the test group described but also of the one used by Zube, who noted the importance of "land form or relative relief" and of "degree of naturalism" (25, p.373). Craik remarked on the role of distance, obviously related to landform, and Fines (12), Linton (29), and Wright (30) assume that mountain scenery ought to be judged aesthetically superior. Can we be content with predictive systems that tell us essentially that people prefer mountains while at the same time purporting to see evolutionary significance to this? Is a climax forest topped by bare rock necessarily perceived as a healthier organism than a flat grassland? I think we need to seek a little farther before expressing any satisfaction at the agreement between people as to what constitutes an aesthetically pleasing landscape or at our apparent ability to anticipate that preference by classification of landscape features or by measurement of photographic details.

It is natural enough for a researcher to look in landscape for what is important to him. Shafer, a forester, looks at areas of vegetation. Litton, a landscape architect, looks for compositional features. All are, I suspect, susceptible to the unfortunate but natural tendency of specialists to try to explain everything in terms of what they already know (31). This often leads to the reduction of a complex phenomenon to rather simplistic explanations, prefaced by a set of unspoken assumptions that determine at the outset the course the investigation will take. These assumptions also figure largely in the problems surrounding correlation statistics. Of this, Campbell has said:

> If we observe an association of two factors, A and B, there are three main forms of interpretation open to us:
>
> (a) change in A causes change in B;
> (b) change in B causes change in A;
> (c) explanations (a) and (b) are both false, changes in A and B being both effects of changes in some other factor C. The mere existence of the association does not give us any evidence as to which of these three interpretations is correct; this is the essential point, and it is very often overlooked. The only way we can choose between the interpretations is to bring in prior knowledge or belief, the danger is that we do this without realizing it, and, in consequence, without declaring it. (32, p.107)

We must now consider what common assumptions are made in current studies of landscape aesthetics. If they are satisfactory we may press on along the established route; if not, we must consider whether the introduction of alternative assumptions from disciplines not yet heard from might generate a more productive investigation.

2

BASIC ASSUMPTIONS

What are the assumptions common to current research efforts? The first is of course that there is such a thing as an aesthetic response to landscape. This seems intuitively to be true. Then, in proceding with the dual task of determining the beautiful by seeking the opinions of viewers and of looking for common elements in the most preferred scenes, we assume the following:

1) that the viewers we interview will exercise aesthetic judgement.

2) that the response of the viewer is fixed and predictable - people will respond to an appropriate object or configuration in the appropriate way.

3) that the "releaser" of the aesthetic response lies in the formal properties of the object or scene under consideration.

Notice that the validity of proceding with the measurement of preferred landscape rests upon the assumption that the response of the viewer is fairly constant. If it were not, the search for appropriate, measurable structures in the landscape would lose much of its meaning.

Note further that, unlike research into preferences in art, there is not a standard to which we can refer, no recognized experts against whose judgements we can compare those of the test subjects. Instead, we operate on the assumption that the preferences given are adequate indicators of the aesthetic merit of each landscape.

Individual researchers might, if they were conscious of their assumptions at all, wish to phrase them differently or insert some qualifications. But I think it is apparent that assumptions very much like these are needed before one would even decide to attempt a quantification of landscape aesthetics. We must now consider the validity of each in turn.

First, as to the question of test subjects exercising aesthetic judgements, there is obviously very little point in soliciting opinions to use in defining the aesthetically superior unless we believe this assumption to be correct. Statements such as the following suggest that researchers feel confident about this (emphasis mine).

> . . . interviewers measured the *aesthetic perceptions* of campers . . . (16, p.62)

> . . . the equation seems to include a sufficient number of quantitative features in the environment to adequately express *aesthetic preferences* . . . (16, p.65)

> The perspective of public images as "*public aesthetic preference*" should provide a useful theoretical and empirical tool in the quantitification of aesthetic opportunity, and has direct application to water-based aesthetics. (33, p.7)

Unfortunately, few researchers define what they mean by "aesthetic", and those who do often use so broad a definition as to render the term almost meaningless:

> If there is a degree of pleasure in the discernment of these natural objects, then they have aesthetic value. (4, p.230)

A few writers have recognized that "without separate knowledge of the observer's criterion, . . . the meaning of any aesthetic judgement is ambiguous" (34, p.332). But most, if they give serious attention to aesthetics at all, confine themselves to a very few comments on theories of criticism. No attempt is made to demonstrate that the judgements being solicited are in fact aesthetic in nature.

This is a difficult task of course, but one that must at least be attempted if we are to place any confidence in the predictive systems being constructed. The philosopher J.O. Urmson has addressed himself to the problem, though not in so pragmatic a fashion as must be done here (35). He observes that different people viewing the same object might all admit to having enjoyed doing so, and yet have had totally different kinds of enjoyment. For example, one member of an audience watching a play might take aesthetic pleasure in it while another approves of its moral tone, another enjoys the intellectual position put forth, and perhaps one, the theatre owner, takes "economic" pleasure at seeing a full house. All might rate the experience highly, yet only one does so on aesthetic grounds. Urmson claims that we cannot be certain that an object, even an art object, will be appreciated on the aesthetic level; one must ask what mental "set" the viewer is using in assessing it. And that, he says, can be done by listening to the way a person talks about the object. He might use economic terms, intellectual ones, moral ones--or the language we associate with aesthetics. Urmson makes it clear that he is referring to such terms as "beautiful", "moving", and "exciting", but does not give an extensive set of examples. A greater repertoire is provided by another philosopher, F. Sibley (36), who lists words such as "balanced", "integrated", "somber","dynamic", "serene", "vivid", "graceful" and"elegant"--words one might hear in an art gallery. Presumably, if we could eavesdrop on a person experiencing the play mentioned by Urmson, neither the man with pecuniary interests nor the one with intellectual ones would use this kind of word. But the aesthetically interested man would.

Urmson's discussion suggests a possible means of answering the question posed as to whether or not the test subjects were exercising aesthetic judgement. If we could ask them to select the most appropriate terms to describe the scenes in question we might have some indication of which mental set they are bringing to the task. Differences in vocabulary and verbal proficiency do place some limitations on this proposal, but providing a set of terms from which to choose seems a simple solution. If we simply ask that any applicable term be selected, a mixture might well result. But if we ask for the most appropriate terms only, hopefully the subjects' "first choice" will reveal the mental set favoured.

In conjunction with the test sessions described earlier, a set of adjectives containing 20 aesthetic and 20 non-aesthetic terms was provided (Table 3). The subjects were presented with 20 of the test slides, and asked to choose the seven adjectives which best suited the scene in question. The number seven was chosen as the smallest set from which probabilities could later be calculated. To avoid prejudicing the results of this test, the word "aesthetic" was avoided in the instructions given the subjects.

However, two circumstances combined to make the calculation of probabilities pointless. First, in pre-test experiments with this technique, several volunteers expressed dissatisfaction with being limited to the set of adjectives provided. They claimed not to find enough suitable ones in the group. Accordingly, in the actual test subjects were told that if they found the list inadequate, they could insert choices of their own. This was rarely done, but where it does occur it amounts to the subject drawing from a larger set and makes calculation of the probability of his selecting such-and-such a number of aesthetic or non-aesthetic terms impossible.

The second circumstance negates even that problem. As it turns out, no subject showed a significant preference for either aesthetic or non-aesthetic terms. The test group selected an average of 2.88 aesthetic adjectives (range 2.30 to 3.39). There were a few cases of a subject choosing six aesthetic terms for one particular scene, but this was extremely rare (8 out of 1220 cases). Furthermore, a questionnaire designed to see if the results obtained from the test group were indicative of the public at large produced very similar results: of 191 questionnaires returned, none showed strong tendencies toward strictly aesthetic terms, the mean being 2.72 (range 2.59 to 2.80).

Table 3 - Set of aesthetic and non-aesthetic adjectives

aesthetic		*non-aesthetic*	
picturesque	beautiful	rough	bare
monotonous	ugly	plain	bright
desolate	depressing	dry	pure
moving	flowing	empty	colourless
dynamic	lovely	wild	cool
serene	barren	invigorating	secluded
dull	horrible	natural	open
chaotic	drab	crisp	alive
sublime	exciting	clean	refreshing
graceful	uninspiring	colourful	uninviting

It would seem we must conclude either that the test does not work or that there are many considerations involved in assessing landscape photographs. The latter interpretation does not seem unreasonable, but I do think the test could be improved upon, at least in the list of adjectives provided. In retrospect it seems to me that there are several ambiguous terms that I would wish to eliminate and other kinds of aesthetic term I might wish to add, notably those with high metaphoric import. However, even with the list as it stands, the distinction between terms which are simply descriptive and those with aesthetic overtones is fairly clear and probably would have been sufficient to demonstrate purely aesthetic or non-aesthetic mental sets if either had been employed. All that can be said at this stage is that we still have no justification for assuming that opinions solicited from test subjects were aesthetic in nature.

It is of interest that Craik did a somewhat similar test, although for quite different reasons. The adjectives he found to be associated with the most and least appealing scenes were these: most appealing--refreshing, friendly, active, alive, clean, clear, forested, and fresh; least appealing--arid, dry, and dull. The bulk of these are clearly descriptive, which again suggests that the assumption of aesthetic judgement is unjustified.

However, if this does not demonstrate that the judgements are aesthetic, neither does it rule out the possibility. Certainly this preliminary testing of the first assumption would not be sufficient to cast doubts on the overall approach.

What then of the second assumption, that the response of the viewer is fixed and predictable? The high levels of agreement found amongst test subjects seem to indicate that this is the case, and the theories of Weiss, Meeker and Appleton seem to demand it be so. How, other than through the statistical tests used to demonstrate this high agreement, can the assumption be tested?

We can begin by noting that in parallel fields of study, such as the psychology of art, doubts have been expressed (37). Even in the realm of environmental psychology there have been suggestions of variation between groups. Winkel and his colleagues (38) have found that they can distinguish three different "environmental personalities", each with slightly different attitudes toward the environment. Interestingly, one group identified has "a belief in the existence of a set of absolute aesthetic values" (38), p.216). Of this group Winkel says that

> those who score high on [this] personality factor . . . tend to prefer simple and symmetrical designs while those who score low on [this] factor . . . prefer complex and asymmetrical figures. (38, p.221)

Now recall Weiss' contention that ". . . beauty is order; life is order; hence life is beauty" (9, p.286).

> What . . . underlies and makes us sense [objects'] beauty is their display of regularity and consistency; regularity as expressed in such features as symmetry, repetition, and alternation of elements; and consistency, as in the use of curves, proportions, size gradients, and so forth, in subdividing space. In short, we sense the rule of order over randomness, of pattern over chaos, of law over accident. (9, p.286)

The attitude demonstrated by Weiss seems remarkably similar in spirit to that tendency identified by Winkel--"emphasis upon order, predictability, and tranquility" (38, p.221). We might reasonably speculate that many writers on landscape aesthetics share Weiss' "environmental personality", and even that many of the subjects that respond to requests for assistance in these tests are similarly inclined. That is, there could be an unsuspected sampling bias in soliciting volunteers for studies involving the outdoors and conservation, or in sampling recreationists, that would tend to produce a higher level of agreement than actually exists in the population at large.

It is also interesting that the items singled out for praise by Weiss and the group discussed in the

Winkel study are precisely those that are disliked by artistic persons, as shown by researchers into creativity (37,39).

> One of the stylistic variables emerging as particularly distinctive of the creative is a cognitive preference for complexity--the rich, dynamic and asymmetrical--as opposed to simplicity (40, p.59)

It does not necessarily follow that things preferred by artistic people are aesthetically superior. It could even be that the artistically inclined like the challenge of complexity, the chance to make something more beautiful out of it. But nevertheless, it does seem unwise to do as Weiss has done and define the beautiful as precisely those sorts of thing which creative people, including artists, find uninteresting. It may well be that the features Weiss has identified are important in human enjoyment, or at least in that of a portion of the species, but his assertion that cognizance of these features is central to aesthetic appreciation appears suspect.

Thus, despite the high agreement on landscape preferences noted earlier, we must admit the possibility of this being misleading. It might be possible to test this empirically by doing identical tests with persons known to represent Winkel's three environmental personalities, but in lieu of this we can only wonder. However, there is available a different kind of evidence which will permit us to consider the constancy of the human response to nature: the descriptive literature of our own culture.

When working on the assumption of constancy and unanimity in the response to landscape, it is difficult to explain the following descriptions of our most favoured category of landscape:

> "Nature's Shames and Ills" and "Warts, Wens, Blisters, Imposthumes" upon the otherwise fair face of Nature. (41, p.2)
>
> "cloud-threatening, supercilious, crump-shouldered, unfrequented, foresaken, melancholy, pathless". We find, too, such epithets as "Earth's Dugs, Risings, Tumors, Blisters, . . . Earth's Warts". (41, p.35)
>
> "high and hideous" and "monstrous excrescences of nature". (42, p.40)
>
> an early tourist to the Rockies could write of Pike's Peak, now a revered national monument: "The dreariness of the desolate peak itself scarcely dissipates the dismal spell for you stand in a confusion of dull stones piled upon each other in odious ugliness". (43, p.306)

These might be thought to be atypical examples provided by a few dissident writers, but such is not the case. Ronald Rees has summed it up thus:

> At the present time, our greatest enthusiasm is reserved for wild and mountainous landscapes which now command such reverence that the uninformed

> observer could be forgiven for assuming that our response to them is instinctive. On the contrary, however, the present feeling dates only from the end of the eighteenth century. (43, p.306)

This seems a rather dramatic reversal, though perhaps not a surprising one to an art historian who might well deduce from such shifts in taste that "most of our ideas of beauty are pure convention" (44, p.35). One historian observed that "taste changes with the generations, and no one taste is more worthy or abiding than another" (45, p.270). A philosopher has written

> . . . there are indeed standards or ideals of beauty . . . in the light of which we make our judgements of beauty. But these standards, let it be well noted, are both personal and likely to change (46, p.99)

The point I wish to make is that objects that evoke a positive aesthetic response do differ from one age to another. It need not surprise us, therefore, that there are changes in landscape preferences as well. Even Appleton, who asserts that "our enjoyment of landscape *is* based on . . . behavioral laws" (13, p.220) admits that

> It is a matter of common observation that different people at diverse times and places have shown clearly expressed preferences for all manner and types of landscape. (13, p.220)

Appleton is then forced to try to show how this variability can be seen as consistent with his theory of landscape appreciation. He says, for example,

> In spite of these differences of "taste", however, it is not difficult to find an underlying unity of concept in prospect-refuge terms. [the passage quoted by Appleton] . . . is essentially saying that the Japanese garden lays more emphasis on refuge symbols ("dusky shades," "twilight profundity") than its more prospect-dominant western counterpart ("sunny openness", "as open as possible") (13, p.228)

But it is difficult to see how "dusky shades" and "sunny openness" can be equated. For saying that these are merely the opposite ends of a continuum (prospect-refuge) is still saying that they are opposites. And the tendency he notes in landscape painting "to move the balance toward the prospect-dominant end of that continuum" (13, p.229) is still a switch in taste. If at any time during that shift we had chosen to pick the current "standard" and define it as the aesthetically "good", we should have been surprised at the results of current research--even if they are still on the same continuum.

In response to an argument by the eminent art historian E.H. Gombrich that the painting of an object often precedes its acceptance by society, Appleton maintains that this is simply "a process of 'learning' from the painters, a process superimposed on a basic 'inborn' sensitivity to certain kinds of environmental phenomena"

(13, p.235-6). Through this accumulation of epicycles Appleton feels he is able to make theory match admitted fact, that taste in landscape does change. Given this, we must ask ourselves what justification we have for supposing that the current assessments of aesthetic merit in landscape are fit to act as standards upon which to plan for future environmental needs. The assumption of fixity of response is clearly not warranted.

This plasticity of response clearly raises some doubts about the "biological" theories mentioned earlier (p. 6-10). Yet the difficulty might be side-stepped if the authors wished merely to assert that people respond aesthetically to certain objects, rather than that a *positive* aesthetic reaction must result. It has been many years since the terms "aesthetic" and "beautiful" were considered synonyms by philosophers of art or by artists themselves. This plainly leads to some other possibilities which will need to be discussed later.

The third assumption, that the land itself is the possessor of aesthetic properties, would almost have to be accepted before one would consider trying to quantify the aesthetic merit of a particular area by measuring something in the scene: And that the properties thought to be of importance are formal (as opposed to other properties to be discussed later) is apparent from the emphasis placed by Shafer on " . . . shapes, sizes, and colors of individual trees . . . ." (24, p.12) and from the U.S. Forest Service assertion that "an observer sees landscapes in terms of form, line, color, and texture" (47, p.8). This does not seem unreasonable, for clearly these things are important in aesthetics.

But is this emphasis on the object, and on its formal properties in particular, viewed sympathetically in the field of aesthetics proper?

Compare this statement by Shafer

> The purpose of the study was to identify what quantitative variables in a natural landscape are significantly related to public preference for that landscape. By knowing what quantitative features in a landscape affect its aesthetic appeal, natural resource planners can make decisions on a factual basis about purchasing, developing or preserving these features. (15, p.1)

with this one by Clive Bell:

> . . . if we can discover some quality common and peculiar to all the objects that provoke the aesthetic emotion, we shall have solved what I take to be the central problem of aesthetics. (48, p.17)

Bell finds a name for the thing he seeks:

> . . . lines and colours combined in a particular way, certain forms and relations of forms, stir our aesthetic emotions These relations and combinations of lines and colours, these aesthetically moving forms, I call "Significant Form"; and "Significant Form" is the one quality common to all works of visual art. (48, p.17-18)

I suggest that "Significant Form" would be a perfectly satisfactory name for the object of our current search. However, I must point out that Bell is primarily concerned with art (although he does speak of "pure form" in respect to nature and so opens the way to an extension of his theory to landscape (48, p.44)). My point in introducing his work is to demonstrate that there is indeed a school of thought in aesthetics that emphasizes the formal properties of the aesthetic object, and to suggest that if these people were to speculate about the aesthetics of landscape, their conclusions would probably not be very different from those of current researchers.

Along with this "formalist" theory goes the assumption that the viewer will respond more or less automatically to the proper "releaser", to the Significant Form detected. However, Bell also allows for variation in the operation of this "aesthetic emotion", and says only that if a person's aesthetic faculties are functioning perfectly--which is rarely the case--then he must respond as predicted. Since we only approach perfect functioning in differing degrees, there is room for a great deal of variation in the actual reaction.

But saying that a formalist position can be maintained is not to say that it can be assumed to be the correct one, for there is certainly no shortage of opposing points of view.

One of the "biological" theorists mentioned earlier recognized this and offered a useful dichotomy:

> The two positions differ in the *locus* of aesthetic experience assumed by each: for Weiss, beauty is a property inherent in things; for Langer, beauty exists in the human response to things. (10,p.128)

The approach Meeker connects with Suzanne Langer is better exemplified by other writers:

> "Beauty is no quality in things themselves: it exists merely in the mind, which contemplates them and each mind perceives a different beauty. One person may even perceive deformity where another is sensible of beauty; and every individual ought to acquiesce in his own sentiment, without pretending to regulate those of others". It is long since Hume wrote this: but not long enough for it to become a part of educational theory. (49, p.109)

This "subjectivist" position emphasizes the role of the subject (viewer), as do, in a less extreme way, the "aesthetic attitude" theories of Stolnitz (50) and Bullough (51). The frame of mind or mental set that a viewer brings to a subject is claimed to be of great importance in determining whether or not he will enjoy an aesthetic experience. If this position should be found more plausible than the formalist one currently in vogue with researchers, then the search for significant formal properties in nature loses a measure of its importance.

At this stage I wish to do no more than draw attention to the fact that there are very credible opponents to compete with formalism for our support. I also must point out that the dichotomy outlined by Meeker, while a very useful one, is rather too simple to be presented here without some qualification.

In the first place, none but the most extreme in either "camp" would wish to rule out the importance of either the viewer or the object in the aesthetic reaction. They might better be said to differ in the amount of emphasis placed on each. But even that qualification is not enough; for within each camp there are subdivisions. For instance, we have been talking of current researchers' stress on the formal properties of the object, but there are other non-formal aspects of natural objects which demand attention.

Some formalists might even wish to argue that the form is to a large extent imposed on the object by the viewer, thereby taking something of an aesthetic attitude position. But even though the differing viewpoints within the field of aesthetics do not fall neatly into the two groups outlined by Meeker, I think the contrast he has drawn is useful and one to which we will wish to refer again.

There is one more line of evidence that may have a bearing on this problem. If the response is to the formal properties of landscape, surely it is safe to predict that the assessment given two photographs of the same scene will be similar. That is, if it is the morphology of a scene that is important, its prominent rocks or trees, the lines that lead the eye toward a focal point and so forth, then the repeated presentation of a scene should draw much the same response each time. As a check on this, four sets of duplicate scenes and two sets of triplicate scenes were included in the test described above. In each set, all photographs were taken at the same site and as close as possible to the exact location. The intention was that the only variants would be weather and season (and in the case of one slide in a triplicate set, lighting angle).

Yet in three of the four sets of duplicates, there were significant differences (as determined by Duncan's multiple range test) between ratings given the same landscape. In one of the sets of triplicates there was a significant difference between two of the slides, the third lying between them in value. In the other triplicate set, there were significant differences between all combinations of slides (Table 4).

These results seem difficult to explain when working on the assumption that the response is to the formal properties of the landscape. For instance, the top-rated slide in the entire test ranks 55th when seen in cloudy weather without dramatic cross-lighting. And the slide ranked 4th becomes 38th when seen with clouds and a little snow. Very few studies have given any thought to the importance of weather (30,52), but clearly it can have considerable influence on the perceived attractiveness of a scene. At the very least, an evaluative system ought to take into account the average weather conditions in a given area before settling on a measurement of its aesthetic potential. But one might also conclude that simple physical measurements are not sufficient to explain landscape preferences.

Table 4 - Differences in mean ratings assigned to slides of the same landscape in differing atmospheric conditions.

replicate no.	*mean ratings of slides in each set*[*]		
1.	4.623	5.049	
2.	4.689	5.230	
3.	4.082	4.656	
4.	4.623	5.689	
5.	4.197	6.131	6.475
6.	4.820	5.656	6.180

[*] all ratings are significantly different from the others in the set at $p < .05$ except those underlined.

Earlier in this discussion results were presented to show the relative importance of various factors in determining aesthetic preferences for landscape (Table 1). These indicated that it was indeed the physical properties that were of importance in determining preferences. This appears to contradict the evidence just presented.

However, it is probably a question of the relative importance of various factors. Certainly the landscape viewer of 1976 does consider the relief of the land to be more important than the cloud cover at the time the scene was viewed. But given a particular scene, the assessment can evidently be altered by ephemeral effects, which current rating systems do not take into account. In fact, if we consider mountain scenes only, then cloud cover becomes the single most important element in determining preferences (Table 5).

Table 5 - Correlation of landscape factors with test group preferences for mountain scenes.

parameter	*Pearson's r*	*% variance explained*
cloud	0.5691	32.39
focal composition	0.3361	11.30
feature composition	0.1916	3.67
distance	0.2881	8.30
observer position	0.0376	.14
colour perspective	0.0839	.70
light angle	0.2786	7.76
panorama	0.0811	.66
wildness	0.0552	.31

We might wonder then if the rather single-minded search for important formal properties is justified, or whether Rudolph Arnheim's comment concerning art is not appropriate:

> . . . any description of form in the static terms of sheer geometry, quantity, or location will fatally impoverish the facts . . . the dynamic, or expressive aspects are the most powerful . . . whereas the static attributes of shape, size, line, or location on which scientists have concentrated their attention would seem to be relatively indirect and late products of vision. The detached, measuring gaze of the investigator in the laboratory preserves little of the spontaneous excitement which the child, the primitive, the artist find in the world of sight. (53, p.199)

I alluded earlier to the possibility of our horizons being rather too narrow in the range of assumptions we bring to this task. Certainly the importance of ephemeral properties could have been anticipated by a student of the humanities who was familiar with such observations as Claude Lorrain's that "the centre of a landscape is an area of light, and everything must be subordinate to a single mood" (54, p.70). Another painter, Constable, claimed that "the best lesson on art he had ever had was contained in the words 'remember that light and shadow never stand still'" (54, p.32). Bellini "was born with the landscape painter's greatest gift: an emotional response to light" (54, p.23). And "Brunellesco's attempt to reduce nature to terms of measurement had been defeated by the sky; and it was the sky which inspired those Dutch painters who first made an impression of landscape their whole subject" (54, p.31)

These accounts sound rather different than those we find in contemporary research papers. Rather than stress landforms and areas of vegetation, they speak of light and sky, of the ephemerals of landscape that we have so far neglected. Indeed, rejection of detail is an essential element in the success of the great landscape painters.

> You see here we have gloom, here glitter, and here long lines flowing upwards. That, you feel at once; but when you begin to enquire what kind of flowers these little lights are, or what sort of stones these forms mean, you become a botanist, geologist, or what not! Yes, the first moment is the artist's moment. (55, p.31)

This contrasting, by Whistler, of the scientific appreciation of nature with the artistic, naturally conjures up Darwin's oft-quoted complaint that science had robbed him of his ability to experience aesthetically (56, p.53-4). We might wonder, with Fleming, whether it is indeed possible to "unweave the rainbow and still expect the heart to leap up" (57, p.579). Can something like an aesthetic response really be understood through normal scientific procedures? It is a debated point, but an attempt is certainly being made (58). But most researchers have tended to ignore the ephemeral properties in favour of more concrete ones--and not surprisingly so, given the human tendency to search where the light is brightest, even though the object we seek fell in the dark.

It seems clear that current emphasis on formal properties alone leads to the exclusion of elements that can be shown to influence preferences and which are designated by artists as important in the aesthetics of landscape. This would suggest that the current view is a rather impoverished one and that some instruction from other disciplines could be useful.

This section began with the enumeration of three assumptions common to attempts to quantify landscape beauty. The first, that the viewers whose opinion is solicited will exercise aesthetic judgement, appears to be at least unproven. The second, that the response of the viewer is fixed and therefore predictable has been shown to be unsound. And the third, that the formal properties of natural objects are responsible for the experience of beauty is clearly only one of many possible aesthetic theories. Furthermore, there is evidence that the response can be substantially altered by ephemeral effects not taken into account in the quantification of landscape beauty.

It would seem that the assumptions underlying current research are by no means unassailable, and that the investigation might profit from further discussion of the work being done, its possible consequences, and alternative approaches.

3

THE REVELATION OF LANDSCAPE

With the realization that the foundations of current research are not self-evident truths, that they are simply assumptions and far from the only ones which could be adopted, comes a different perspective on the meaning of the results presented. If it turns out that what we have taken to be aesthetic preferences are not, then what are they? If the mystery we call beauty does not lie wholly in the object which seems to us beautiful, where does it lie? If preferences in landscape are mutable, what brings about such change? And if we proceed to plan for future needs on the basis of these questionable assumptions, what possible consequences might there be?

I think we can best begin a consideration of these questions, and of alternative assumptions that might lead to different conclusions and consequences, by pursuing Gombrich's provocative suggestion that tastes in landscape are the result of familiarity with landscape paintings. His actual proposal is this:

> In other words, I believe that the idea of natural beauty as an inspiration of art . . . is, to say the least, a very dangerous over-simplification. Perhaps it even reverses the actual process by which man discovers the beauty of nature. We call scenery "picturesque"--as Richard Payne Knight knew long ago--if it reminds us of paintings we have seen. (59, p.117)

> Similarly, so it seems, the discovery of Alpine scenery does not precede but follows the spread of prints and paintings with mountain panoramas. . . . Thus, while it is usual to represent the 'discovery of the world' as the underlying motive for the development of landscape painting, we are almost tempted to reverse the formula and assert the priority of landscape painting over landscape 'feeling'. (59, p.118)

Oscar Wilde, writing more than half a century earlier, was more than tempted.

> Cyril: Nature follows the landscape painter, then, and takes her effects from him?
>
> Vivian: Certainly. Where, if not from the Impressionists, do we get those wonderful brown fogs that come creeping down our streets, blurring the gas lamps and changing the houses into monstrous shadows? To whom if not to them and their master, do we owe the lovely silver mists that brood over our river, and turn to faint forms of fading grace curved bridge and swaying barge?
> . . . Things are because we see them and what we see, and how we see it, depends on the Arts that have influenced us. To look at a thing is very different from seeing a thing. One does not see anything until one sees its beauty. Then, and only then, does it come into existence. At present, people see fogs, not because there are fogs, but because poets and painters have taught them the mysterious loveliness of such effects. There may have been fogs for centuries in London. I daresay there were. But no one saw them, and so we do not know anything about them. They did not exist till Art had invented them. (60, p.78-9)

Wilde's remarks are interesting not only because they put the case so delightfully and provocatively, but also because the role he assigns to the artist will require further consideration. But at present it is sufficient to note that there is a considerable body of informed opinion that is in sympathy with the position here identified with Wilde and Gombrich. Marjorie Hope Nicolson would no doubt wish to amend the assertion that "the only effects she [nature] can show us are effects that we have already seen through poetry, or in paintings" (60, p.87) to include insights given us by science. But whatever the source of instruction, there is agreement with the premise that instruction is required.

> . . . we assume that our feelings about mountains are the perennial ones of human beings. We do not ask whether they are sincere or to what extent they have been derived from poetry and novels we have read, landscape art we have seen, ways of thinking we have inherited. Like men of every age, we see in Nature what we have been taught to look for, we feel what we have been prepared to feel. (41, p.1)

> It is generally true that all changes or expansions of popular taste have their origins in the visions of some great artist or group of artists, which sometimes rapidly, sometimes gradually, and always unconsciously, is accepted by the uninterested man. (54, p.74)

> That nature imitates art is too timid a dictum. Nature is the product of art and discourse. (61, p.33)

One can produce similar statements from such authors as Koestler (62), Randall (63), Manwaring (64), and Friedlander (65). One can even find support amongst contemporary psychologists, such as Rudolph Arnheim, whose writings Child has summarized thus:

> Of special significance for a social psychology of art is Arnheim's emphasis on perception as an active process, capable therefore of varying in different individuals facing the same scene. . . . familiarity with work embodying a particular mode of perception may dispose the viewer himself toward the same mode of perception. The meaning of a work of visual art may thus be said to be in part its embodiment of a mode of perceiving. (37, p.866)

Perhaps it is unnecessary to belabour the fact that aesthetic responses are known to change and that they may be influenced by the guiding force of a society's "visual experts", its artists. One writer, Northrop Frye (44), has gone so far as to suggest that the role of the artist is just this, to see in a new way, think in a new way, and then to display to the public these discoveries or alternate realities for its consideration. The society choses from among them the reality it wishes to embrace, the "dream" it wishes to imitate. But whether we wish to agree with Frye or not, we may at least wish to consider the possibility of such influence on the preferences detected in current landscape research.

This is a difficult possibility to investigate, for while we know that the taste for mountains is a recent one, we have only the informed opinion of art historians that the painting preceded the preference. But if present-day standards are even partly derived from "instructors" of former years, we might at least expect that some element common to their work could be detected in highly-rated landscapes today. We would also expect that contemporary landscape painters, who presumably are trying to see in a new way, would not show any predilection for stereotype, or at least would show less than the non-artist.

The initial difficulty, one which is beyond my ability to satisfactorily overcome, is in deciding what elements are typical of landscape painting of the last century or earlier. I stress the last century on the assumption that the public takes a considerable time to absorb new standards, and so to expect instant adoption of the standards of more recent artists would be unreasonable. It would require extensive documentation to substantiate the assumption I must now make, but I think that if the reader were to search his own memory he might incline toward the view that a standard "type" of painting is the scene with high sides and a deep valley, and usually with water of some sort at the centre of the line of focus. Another "type" might be one using a different technique of drawing the eye to the centre, that of featuring a strong, dominant object such as a single mountain. Or there might be a combination of the two, with strong diagonals leading into the central mountain. These seem credible as standard "models" of landscape painting, but of course they cannot be accepted without reservation. There is some expert support, however.

> It is worth pausing to consider some of the means by which he [Poussin] solved the problem of landscape painting . . . as they were to influence all those later painters who have tried to give landscape an air of order and permanence . . . Poussin . . . conceived that the basis of landscape painting lay in the harmonious balance of the horizontal and vertical elements in his design. He recognized that the spacing of these horizontal and verticals and their rhythmic relation to one another could have an effect exactly like the rhythmic *travee* or other harmonic devices of architecture; and in fact he often disposed them according to the so-called golden section. The chief difficulty of imposing this geometric scheme on nature lies, of course, in the absence of verticals. Landscape is essentially horizontal, and such verticals as exist are not always at right angles to the ground. To meet this difficulty Poussin, in his more schematic compositions, was fond of introducing architecture . . . It was essential to Poussin's design that his verticals and horizontals should meet at right angles . . . But since penetration into space is the essence of landscape, Poussin had to devise means of leading our eye back into the distance. No doubt the way most congenial to his mathematical mind was the central point of perspective, but he saw that this was too rigid and artificial to be anything more than an occasional solution. He therefore fitted into his scaffolding of horizontals a subsidiary scheme of diagonals which would conduct the eye smoothly and rhythmically to the background . . . (54, p.65-7)

Note the emphasis on verticals, which are often absent or subordinate in nature, and on the construction of perspective to lead the eye into the distance. Paul Shepard found, by examining the sites at which paintings had been done, that American landscape painters had a consistent tendency to exaggerate the vertical magnitude of scenes they painted (66).

Yi-Fu Tuan observed that

> For maximum effect, perspective depends on convergent straight lines. Nature offers few straight lines. Two solutions were popular with European artists in their effort to exploit geometry. One was to organize the objects in the landscape along convergent orthogonals ; . . A river valley, with its convergent flanks and the diminishing width of the river upstream, offers the closest approximation in nature to the artificial conditions of one-point perspective. (67, p.136)

Tuan also discusses the effect of lighting in accentuating the sense of perspective, and refers to these developments as artistic innovations. So too does Stechow (68, p.35) in discussing the evolution of "side-wing" framing, a device essentially similar to the river valley example given by Tuan but also suitable to flatter landscapes through the use of large flanking trees. This was needed to provide the "necessary stabilizing quality" but was nonetheless only slowly adopted by painters. The reader will recall that just this property was tested earlier under the name "focal composition"-- the tendency of lines to converge in the distance--and found to be a significant feature of preferred scenes. If such a composition is in fact an innovation and not, as Weiss and Appleton might wish to argue, a basic biological response, which the artist merely exploits, then the presence of such devices in highly-rated landscapes would appear to offer circumstantial support to the hypothesis propounded by Gombrich and the others cited above. And in a sense the current preference for mountains does the same, inasmuch as they constitute the landscape type best provided with the strong verticals necessary for deep perspective. But it would be still more satisfying if measureable similarities could be detected between standard landscape paintings and current tastes--although again, only Gombrich's observation that the depiction of alpine scenery precedes its popularity deflects the criticism that any similarity between paintings and preferred scenes merely demonstrates the artists' agreement with everyone else about the merits of mountain scenery.

Measuring the strength of perspective in landscapes turns out to be a complicated business, for one is immediately drawn into a morass of lines and shapes that provide endless opportunities for measurement. Even when it is evident that there is strong convergence toward the centre of a scene, choosing lines to measure is no simple matter. But by generalizing somewhat, an attempt can at least be made.

We might look for "tendencies" to strong perspective, provided either by converging lines or by the presence of a strong central object. And, rather than try to identify all the elements that contribute to the effect, we might look for a basic pattern. For example, the first type of scene mentioned above looks roughly like Figure 1.

Notice that the effect of the strong "sides" is not only to draw the eye to the centre, but to make of the sky a sort of wedge. Might the "steepness" of that wedge, or its actual size, provide a crude estimate of the strength of the perspective? Although it seemed an extremely crude method, it was finally attempted with the following modifications.

To accommodate a second type, the "feature" landscape, an attempt was made to measure the central object itself. And to allow for its apparently beneficial effect on any scene, water was treated as an amplifier of the effects being investigated. The exact procedure for making the measurements is as follows.

(1) First, a decision has to be made as to whether the composition is predominantly "focal", "feature", or "flat". The possibility of a combination of the first two was ignored for the sake of simplicity.

(2) In the case of focal compositions, vertical lines were dropped from points 1/4, 1/2, and 3/4 of the way across the top of the scene until they intersected the highest

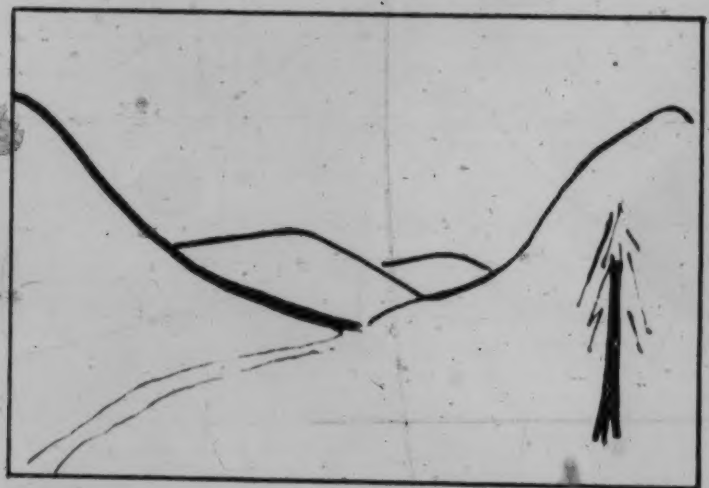

Figure 1

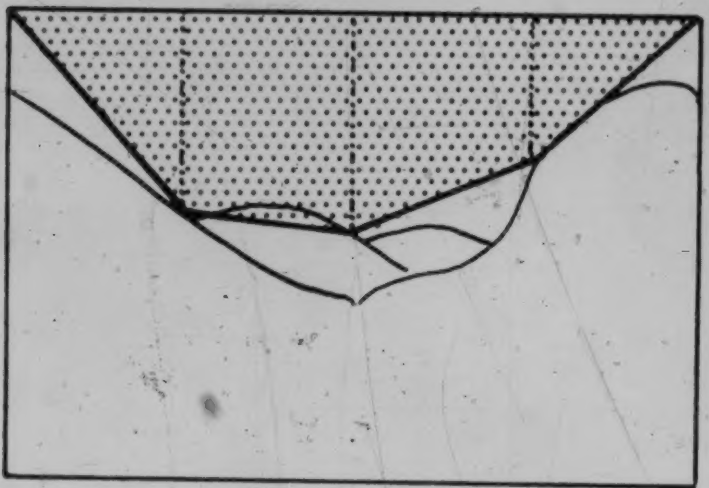

Figure 2

points in the scene; then these points of intersection were connected to each other, and to the upper left and right corners, as shown in Figure 2.

(3) The area of the "wedge" so formed (stippled area) provides a measure of the degree of focal composition.

(4) If water is present in the scene, it may amplify the focal effect in two ways: as a wedge based on the bottom of the scene in direct opposition to the sky wedge above (Figure 3); or as a horizon-based wedge coming to a point at the base of the scene (Figure 4).

(5) The area of this secondary wedge can be added to the primary one for a total measurement for the scene.

(6) In the case of a "feature" composition, the central structure must be identified, a line drawn at it's base, and connecting lines drawn from the outer edges to high points 1/4, 1/2, and 3/4 of the way across the scene. This again provides a wedge to measure (Figure 5).

(7) As with the focal composition, the feature composition can be modified by water in the ways described above.

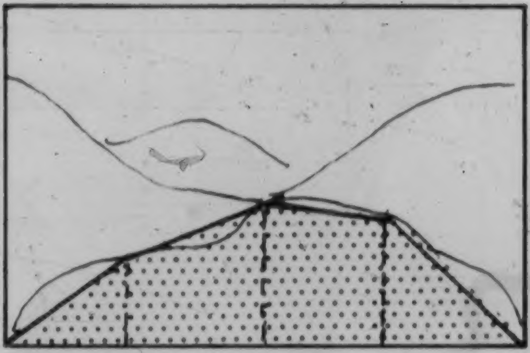

Figure 3

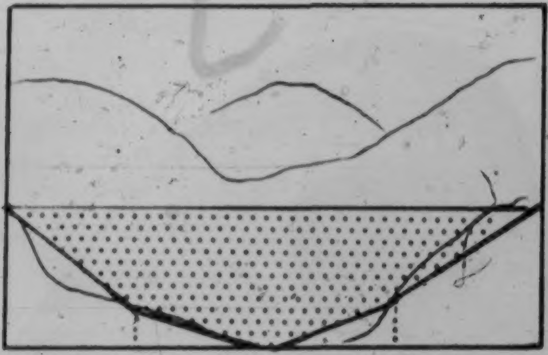

Figure 4

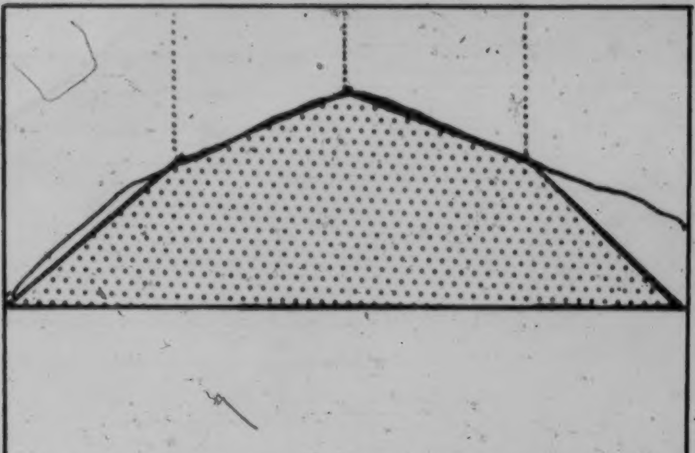

Figure 5

(8) Finally, if there is no indication of either focal or feature composition, there is no area to measure and a rating of zero is indicated.

It is immediately obvious that this procedure is crude and laden with shortcomings--the fact that the area of the "sky wedge" would be influenced if the horizon were greatly lowered in one slide as compared with the rest, for instance. In fact, the procedure would seem too rough to merit any attention if it were not for the fact that it consistently out-performs all other factors in the prediction of landscape preferences. Furthermore, it works for any sub-set of landscapes and remains significant even in partial correlations in which each of the other predictors are controlled for, singly or in pairs. For the full set of test slides, the correlation was 0.8407 ($p<.001$); for mountain scenes only it was 0.6246 ($p<.001$). This compares with -0.3182 and -0.1274 for the Shafer formula. One can imagine modifications that might make the measurement more subtle, but for present purposes the fact that it works at all is the important point. Even slight variations of the measurement, such as measuring the "depth" of the wedge from base to apex, at the centre of the scene or at its "deepest" point, give similar correlation values (0.7889 and 0.8213 respectively).

With a measurement such as this, it is difficult to be certain that it really does what it was intended to do. But if it actually is an indicator of the strength of focal or feature composition, then it would seem to add a measure of support to the proposition that current landscape tastes are at least in part the result of prior exposure to conventional landscape paintings. And if this is true, it may explain why people tend to agree on what is beautiful in nature despite the different environments in which they were raised--we all share a common "aesthetic" environment through our exposure to the same landscape paintings, the same stereotypes of the ideal landscape. And we respond to an actual embodiment of that ideal with approval. In fact, "beautiful" might be used in more of a descriptive than aesthetic sense, indicating recognition of a scene of the type that is called beautiful (69).

Even if this procedure does not do what was intended, it again raises doubts about the usefulness of predictive systems developed by correlation with popular preferences. For if even this crude measurement can produce highly significant correlations, are those produced in serious attempts at quantification of landscape aesthetics as subtle and reliable as is implied? On the other hand, if the technique does do what was intended, it might suggest a possible re-interpretation of the Shafer method. Since both techniques depend on formal properties of photographs of the scenes, what is said of this "graphic analysis" might also be true of the Shafer approach. Perhaps it too measures, albeit unintentionally, the similarity of a photograph to a stereotyped landscape painting.

Earlier (p. 39) reference was made to Campbell's warning about the assumptions brought to the interpretation of association tests. Researchers have assumed that A (landform) causes B (aesthetic appreciation). Yet it was noted that an opposing point of view, here called the aesthetic attitude approach, might claim that B causes A--that is, the active mind of the viewer seeks out desirable elements in the land being viewed. And now the third possibility emerges, that another factor C (education of the viewer by landscape painters) might alter both B (the aesthetic preferences) and, in a sense, A (the forms perceived or noticed). All of which seems fully to justify Campbell's warning that "our prior ideas are a fundamental part of every analysis we carry out, and are bound to have an immense influence on our conclusions" (32, p. 108-9). Therefore when relying on tests of association it is clearly essential that we be aware of our assumptions and of their consequences, a requirement which I think has been lacking in landscape research to date.

What of the second part of our hypothesis, that there ought to be a portion of our society that rejects this stereotype and attempts to see nature with fresh eyes? What do present-day landscape artists find interesting in the landscape?

An initial difficulty arises in trying to assemble a group of individuals who have demonstrated a creative interest in landscape. They are rare, and I think not partial to participating in research projects. But a small group of cooperative individuals was found and given the same set of test slides to evaluate. The group consisted of one landscape architect, one landscape painter/art historian, and three landscape painters. All are men of demonstrated ability, the latter three being active exhibitors in galleries across the country.

The simplest method of comparing the preferences of the "experts" with those of the test group would be to compare the mean values assigned to each slide by each group. However, mean values will only tell us something about the preferences of the group if there is agreement within the group. This was the case with the test group of course, but amongst the artists it is not. That is to say, what one artist rates as outstanding may seem to another completely uninteresting. This might be in part due to the small sample size of the group, but it seems unlikely that the difference would be so great (F value = 1.0439, p=.3905 as compared with the test group's F = 41.9955, p<.00005). A check of three samples of four subjects each, drawn randomly from the test group, revealed significant levels of agreement in all samples ($p < .00005$ in each case).

It would seem that the artists do differ from the test group in their lack of agreement on what constitutes an outstanding landscape. Since the artists cannot be treated as a group to compare with the other, the best that can be done is to compare each artist with the test group. The results are shown in Table 6.

Of all the artists, only number 4 shows significant agreement with the test group. One other shows a non-significant level of agreement, and the other three show negative correlations--that is, what the test group rates high, they rate low and vice versa.

All of this--the general disagreement with the preferences of the test group and the lack of agreement amongst themselves--is consistent with the hypothesis that these persons are working on highly individualistic standards of aesthetic excellence. This is the group we should expect to be least influenced by the stereotype of landscape beauty. And if this is so, it becomes ironic that some researchers have actually excluded all subjects who indicated any interest in art, on the grounds that they might have been taught to

Table 6 - Correlation of expert ratings with test group ratings

artist no.	*correlation (Pearson's r)*	*significance level*
1.	-0.3730	.001
2.	-0.4825	.001
3.	0.1390	.109
4.	0.6057	.001
5.	-0.1758	.059

see in a particular way (70); it would seem that this should be the group least groomed to do so.

There seems no possibility of defining what each artist finds attractive. They seem able to detect aesthetic potential in virtually any type of landscape (see Appendix A). Obviously each prefers some scenes over others, but the reasons for these preferences are not obvious and do not seem to relate to land type *per se*. Nor does each see the same potential in a given scene. ". . . a single mountain combines in itself several thousand appearances", apparently (71, p.40)

We began with expectations of discovering hard evidence of the aesthetic superiority of some natural environments over others, but the farther we come, the more naive this expectation seems. We find ourselves with a study of "aesthetics" that we cannot show to be aesthetic in nature; with measurement of "beauty" in objects despite the fact that the consensus on beautiful objects is known to be variable; with apparent aquisition of standards through familiarity with the vision of earlier landscape painters; with a lack of appreciation of the tastes of present day "creators" of nature; and with the possibility of applying 19th century standards to planning for life in the 21st century.

The situation seems to bear a passing resemblance to the affairs of landscape art, of which Kenneth Clark has observed that "never has there been such a complete divorce between popular and informed taste" (54, p.132). Clark believes this to be a difficult problem, and asks "how far can an art form retain its vitality when it rests on the passive consent of the mass of uninformed opinion, but is not supported by the active conviction of an informed minority?", i.e., the creative artists (54, p.132). The analogy is perhaps not an altogether fair one, but we do find ourselves with a somewhat similar problem in respect to landscape aesthetics.

4

THE INVENTION OF DISTANCE

Clark fears for the vitality of landscape painting because of lack of agreement between a public, satisfied with one stereotype of landscape given it by the first western men to view it as a purely aesthetic object, and the artist of today who continues to explore it visually. The result in landscape painting is a swamping of the continuing exploration by a deluge of unimaginative, decorative work, ". . . ready-made equivalents for . . . favourite themes" (54, p.86).

> The "consumer" reads the conventional novel, looks at the conventional landscape, and watches the conventional play with perfect ease and self-assurance--and a complete absence of awe and wonder. He prefers the familiar to the unfamiliar, because it presents no challenge and demands no creative effort. Art becomes a mildly pleasant pastime and loses its emotive impact, its transcendental appeal and cathartic effect. (62, p.336)

And what is this "conventional landscape"?

> . . . in general the popular landscapes are those in which the lazy or uninterested eye is suddenly jerked into responsiveness by an unusually resonant contrast of tone or colour. (54, p.87)

Scenes, in other words, like the one most highly rated by the test group in the study described above, with strong, simple compositions of given type, emphasized by dramatic colour and lighting (Appendix B).

Both Koestler and Clark avoid the term "mediocre", though it may well have crossed their minds to use it. We are certainly familiar with that term in regard to another popular "art form", television. That medium has a curious phenomenon associated with it that may have some bearing on the present study. I refer to the so-called "Nielson rating", which purports to identify the "best"--in the sense of being the most popular--of television offerings, so that more of the same can be produced. A variety is offered, the most popular are preserved. We are all aware of the results, of the sameness of those offerings quite aside from the question of quality.

The parallel with the present study arises in the use of popularity as a criterion for preservation. With regard to television, not many would wish to associate "popular" with "excellent", I suspect. We are content to accept the Nielson rating as a measure of popularity, and whatever its shortcomings, it at least purports to be no more than this.

In the case of landscape aesthetics, however, we are inclined to equate the popular with the excellent. Whatever is preferred by the majority is by definition outstanding, worthy of preservation. Even allowing that there are not "experts" in landscape as there are in the art world, are we really justified in assuming that we are developing a measure of aesthetic merit in landscape? Or are we simply devising a glorified Nielson rating, with which to assure a level of mediocrity in our natural environment to rival that of our urban one? Or a tool to provide politicians and planners with an assured popularity, as the sponsor demands of the television producer?

Paul Shepard observed that the very act of regarding landscape as scenery is fraught with danger, for once we set up an arbitrary standard of any kind we invite the evolution of a homogeneous environment (72). If such-and-such is by definition beautiful, then only such-and-such need be preserved for looking at. Just as Leopold cautioned in regard to the economic standard, we may tend "to ignore and thus eventually eliminate" (3, p.210) those landscapes that do not fit the designated mould. The rest of the world may then be delivered over to whatever utilitarian ends strike our fancy (and even regarding landscape as scenery implies a utilitarian approach--we keep it because it is useful to us for looking at). For this reason, Shepard expressed apprehension about treating land as a visual resource. The development of tools of "aesthetic" measurement seems destined to help fulfil his darkest predictions.

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Furthermore, if we know what constitutes the beautiful then not only do we know which areas should be preserved, we also know how to "improve" those less than perfect examples which already enjoy public protection. They can be "enhanced", perhaps through

> Addition of species to plant community to give unique form, color, or texture to an area.
>
> Manipulation of vegetation to open up vistas or screen out undesirable views.
>
> Addition of structures which enhance the natural landscape. (47, p.41)

As can be seen from this exerpt from a U.S. Government publication, there is every intent to "manage" the "visual resources" and to use current research as a tool. This again illustrates the assumption that the beautiful in nature comprises a certain set of physical features which, once known (and apparently they are already known to this agency) can act as the model for the re-shaping of any other landscape (a variation on Shepard's nightmare). Researchers themselves have encouraged this use of their work. Craik, for instance, observes that "systematic landscape appraisal appears destined to form a basis for important environmental decisions" (22, p.11). Leopold began his research to "produce a method that would quantify the esthetic features of the environment so that the resultant data could be used in many planning and decision-making contexts" (1, p.37). Rabinowitz and Coughlin speak of identifying characteristics of preferred lands because "this type of identification is highly important in any attempt to measure the important non-fiscal benefits of a proposed conservation project" (18, p.1). The possibility of undesirable consequences arising from the quantification of landscape aesthetics has not been entertained.

The admirable motives that led researchers to attempt the quantification of landscape aesthetics do not abrogate their responsibility to consider the consequences of their research. In place of the economic reductionism that conservationists hoped to supplant, we are apparently attempting to substitute a new reductionism, a new standard of value by which to judge the worthiness of nature. We come full circle, and find that we remain culpable to the accusation of being agents of entropy, of working tirelessly to mould the world into a single pre-conceived image. Must the endeavour be abandoned then? Is it a dangerous undertaking that ought not be pursued?

We might indeed reach such a conclusion, but it would be unjust to do so without first considering alternative approaches. In the first place, there is probably no reason why such evaluative techniques should not be used for short-term planning on a small scale--to assist planners in setting out trails through heavily used parks, for instance. The danger lies not in this sort of restricted use but in forgetting that it is popularity, not necessarily excellence (if that term has any meaning with respect to landscape) that we are measuring, and in attempting to make this a tool for long-term planning. And no matter what the intent of the originators, a quantitative tool of this sort seems destined to be drawn upon as support for political decisions. One might say that the danger lies not in the tool but in its application, but this does not exonerate the tool or its creators. We have at least the obligation to explain fully the limitations of the system, and to take great pains to point out that it does not, in all probability, adequately describe the aesthetic potential of any landscape.

Second, we must ask whether there are other approaches that would lead to more fertile results. Shepard's fears are obviously well-founded when we regard landscape appreciation as a question of taste, pursued by "pilgrims of fashion" in search of picture-postcard scenery. But I have tried to suggest that the popularity of "landscape--an external scene of nature or an aesthetic artifact created by the romantic imagination" (73, p.147)may not be the same thing as aesthetic appreciation of nature. It might, for instance, be more akin to that fascination with imitation which so dominates in some viewers that "'life-likeness' is regarded as the supreme criterion of art" (62, p.372). But in this case it is a fascination with a piece of nature that faithfully duplicates a landscape painting. These stereotypes may not be shared by artists, and unless we wish to declare that their reactions to landscape are non-aesthetic, it seems difficult to escape the conclusion that other standards are possible.

We must return now to aesthetics proper, to see if an alternative approach might lead to different conclusions than does the formalist one.

It will be useful to consider the point of view that Meeker places in opposition to Weiss'. The notion, that is, that the attitude the viewer brings to the scene is of primary importance in the aesthetic experience. This approach has its origins in the eighteenth century with writers such as Shaftesbury, Addison, and Burke (50). However, its most popular formulation is probably that of the British psychologist, Edward Bullough. His theory, which remains very influential though by no means uncritically accepted, is roughly as follows.

A person does not experience aesthetic pleasure with every sight perceived. He does not find aesthetic excitements surrounding him and interrupting his work throughout the day. And if he should happen, as a part of his labour, to be transporting a great work of art, and his eye accidentally falls upon it, there is no assurance that he will be suddenly moved. Yet the same man, viewing the same painting in a gallery, may be greatly affected by it. Just as a man who normally works in the country may perceive no great beauty in it until he happens to stop to look for it. Under normal circumstances, he is more likely to curse mountains for making his farming less productive or his load more difficult to transport than to praise their beauty or sublimity. (Indeed, it has been argued that a resident is never able to view his home territory aesthetically, for he is too involved with it on a practical level; aesthetics is for tourists (74)).

What then distinguishes the two situations, one in which the response to nature may be resentment or fear, and the other a rapt appreciation of suddenly perceived beauty? Bullough maintains it is the frame of mind the viewer brings to the scene. To appreciate anything aesthetically one must achieve a degree of "psychical distance"; that is, a setting-apart of oneself from daily concerns so as to permit the pure appreciation of the landscape or work of art. Only when this technique is employed is there any possibility of aesthetic experience. Bullough also argues that varying degrees of aesthetic enjoyment may be explained by the variation in "degree" of distancing, but the details need not concern us here. The cardinal point is his insistence that the viewer must actively attempt an aesthetic perception, and that he do so through a process of setting himself off from the "real" world, by

> . . . putting the phenomenon, so to speak, out of gear with our practical, actual self; by allowing it to stand outside the context of our personal needs and ends--in short, by looking at it "objectively," as it has often been called, by permitting only such reactions on our part as emphasise the "objective" features of the experience, and by interpreting even our "subjective" affections not as modes of *our* being but rather as characteristics of the phenomenon. (51, p.89)

There are other theories that differ in particulars from Bullough's but share a generic similarity. The best known is Stolnitz' theory of "aesthetic detachment", which, as the name implies, centres on the detachment of the individual from practical concerns. Stolnitz does not require a special psychological phenomenon for this, but the end result is similar to Bullough's.

Koestler strikes a somewhat similar chord with his concern with "self-transcending" tendencies, that is, with the kinds of behavior that involve transcending personal interests in favour of others, of participation in an oceanic experience (62). Koestler derives his theory from what he argues are fundamental properties of biological organization: self-transcending and self-asserting tendencies. His argument is of interest from the standpoint of theoretical biology, but in the present context it is the emphasis on loss of self-interest that is noteworthy. He also makes the provocative suggestion that an aesthetic experience, which is a self-transcending activity, is quite distinct from "bodily activity" or recreational activity which are self-assertive (75, p.190). By this definition, there is no reason to expect that everyone using recreation areas is interested in self-transcending activities--including aesthetic appreciation. One again wonders, therefore, about possible biases in selecting subjects for the sorts of test described earlier.

Bullough and his interpreters seem to have wanted to stress the separation of viewer and object, though they do not suggest so complete a schism as Ortega y Gasset. In one example he has the artist paying

> . . . attention only to externals, to light and shadows, to chromatic values. With the painter we have reached a point of maximum distance and minimum sentimental intervention.
>
> . . . [there is] a scale of spiritual distances between reality and ourselves. In this scale the degrees of proximity are equivalent to the degrees of sentimental participation in the event; the degrees of distance, on the contrary, signify the degrees of liberation through which we objectify the real event, thus converting it into a pure theme for contemplation. (76, p.415)

There is therefore to be no personal involvement at all, no sentimental attachment to the object. The viewer must be completely detached from the reality perceived. This of course is quite incompatible with theories which demand that aesthetic involvement be a biological phenomenon with utilitarian overtones. Appleton, for instance, says

> But "aesthetic" is not a discriminatory term which includes some activities and excludes others on the basis of their purpose. The pleasure derived from an experience of environment cannot be meaningfully classified on the basis of whether it results in some material improvement or whether it does not. . . . to insist that a particular experience must or must not have a practical outcome in order to make it "aesthetic" is to set up a false distinction. (13, p.171)

As one would expect then, Appleton finds himself in oppostion to the aesthetic attitude school of thought, as would researchers of the formalist persuasion discussed earlier.

This notion of detachment is of considerable interest, for it seems to crop up repeatedly, in different contexts. Ogden has detailed the rise of the idea that "the artist should place his subject at a distance" (77, p.63) throughout the eighteenth century. Among his reflections is the observation that "the value placed upon distant landscapes by tourists and painters corroborates the increased awareness of distance and the greater importance that it assumed during this period" (77, p.66). He cites the use of the "Claude-glass", a convex mirror carried by the tourist to make the landscape appear smaller and more distant, more like a painting--just as the present-day tourist uses his camera viewfinder. This diminishment of visual complexity

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by putting the scene at such a distance as to make details imperceptible may explain in part the popularity of vistas, particularly ones with strong focusing lines that prevent distraction. Winkel has even suggested that minimization of complexity is a psychological necessity for persons of certain personality (the conservationist group in his test), and that, owing to their inability to "see the forest for the trees", the only time they can comfortably "take in" a scene is when its complexity is diminished. Koestler has suggested that the popularity of the picture postcard is due in part to its facilitating a quick and easy perception of a complex whole (62, p.384). This fundamental difference in mode of perception--described as "global" versus "articulated" world-views by Witkin and his colleagues (78)--may suggest yet another source of bias in our sampling. If--and it is a big if--the recreationists tested are similar to the "conservationist" group in Winkel's study, one could certainly predict a greater preference for the simple, focal type of composition than for the more complex arrangements preferred by "articulated" viewers, such as artists.

To return to Ogden: the emphasis on spatial separation between viewer and object contributed to the rise of aesthetic distance, the disinterested contemplation of an object or scene. He observed that "the concept of distance provided a new way of thinking about human experience, a way of thinking that placed greater importance on the individual point of view, on personal orientation, and on the relationship of the individual to his surroundings" (77, p.77).

Individualism, it has been suggested, is one of the major distinctions between the European way of regarding nature and others, such as the Chinese whose thought "has never progressed to the abstract conception of the 'depth' of imaginary space on the two-dimensional surface" (79, p.178).

> These facts go hand in hand with others which, taken as a whole, differentiate Chinese from European landscape painting. The European picture has been described as a "fixed view" (Carus), referring to its direct connection with the viewer. This attitude "construes the experiencing of a picture as a meeting, as an approach by the viewer to the picture as an object, which therefore meets him from the lower edge of the picture. It was this conception alone which led, after various other modes of representation had been tried, to the introduction and development of central perspective in painting"; for this perspective arises in the last analysis from "consideration of the viewer". This picture appears, so to speak, "as if its illusionistic space began with the standpoint of the viewer. The Chinese landscape, on the other hand, is not related to the viewer in this sense; he does not stand on the front edge of a pictorial space that stretches back continuously from his eye into the depth of the painting . . . the viewer's eye is immediately compelled to leap into a spatial depth . . . and he is drawn into the picture and made to identify himself with the little human figures inside it". (79, p.179)

The Chinese landscape painting

> "is intelligible only if the viewer enters mentally into the centre of the picture and looks at it from there" (79, p.180)

Appleton's attempt to imply involvement in landscape on the part of the viewer would seem more compelling if he were speaking of the oriental viewer, rather than of the westerner who habitually puts nature at a distance.

> Western painting, from Masaccio to Cezanne, has consistently illustrated the dogma of the externality of the world, a dogma which, as it has not obsessed the Orient to the same degree, has not been incorporated in its painting. Our painting normally recedes from the observer, and is often judged by critics in terms of whether it takes flight precipitately enough: whether it "goes back," as the phrase is. (80, p.204)

This contrast between the Oriental attempt to involve the viewer and the Western tendency of isolating him is of considerable interest. The European trick of putting the landscape at a distance apparently allows perception of the whole scene in a single "take", without the necessity of scanning the landscape or wandering through it. "Viewing the scene from a distance, we can take in the whole scene, unlike the observer who is in the midst of it" (77, p.77). There is a confluence between the notion of aesthetic distance and actual spatial distance in landscape appreciation. And there is a tendency in the West to separate the viewer from the land, in contrast to the Chinese emphasis on unity:

> In China, as in the West, the desacralization of nature is the work of a minority, especially of the literati; . . . nevertheless in China and in the entire Far East, the process of desacralization has never been carried to its final extreme. Even for the most sophisticated men of letters, "esthetic contemplation" still retains an aura of religious prestige. (81, p.152)

The desacralization of nature may appear to be quite unrelated to the aesthetics of landscape. But bear in mind that the inadequacy of current landscape research stems less from the motives or methodology of the researchers than from their basic assumptions. They fail to consider the possible outcome of the approach they foster, or the validity of their goals. If we wish to suggest that an alternative approach be tried, we must of course ask what the consequences of it might be. And it would appear that one of the effects associated with the rise of landscape aesthetics in the West has been the tendency to put nature at a distance, to objectify it and treat it as a thing quite distinct from the viewer. Bullough's approach seems to imply that this is a necessary condition of regarding anything aesthetically. We might almost suggest that it leads to fostering a kind of environmental voyeurism, in which the viewer sees but must never touch or be touched by the object.

> Sightseeing behind the tinted windows of a coach severs man from nature. On the other hand, in such sports as water skiing and mountain climbing, man is pitted against nature in violent contact. What people in advanced societies lack (and countercultural groups appear to seek) is the gentle, unselfconscious involvement with the physical world that prevailed in the past when the tempo of life was slower, and that young children still enjoy. . . .
>
> The childlike enjoyment of nature places little importance on picturesqueness . . . Visual appreciation, discerning and reflective, creates aesthetic distance. For a young child, aesthetic distance is minimal. (67,p.96)

So too for "primitive" man. In reference to the "objectification" of the universe, von Bertalanffy speaks of this as

> . . . the end-product of a separation proceeding in animals, infants, and human primitives, and resulting from a slow build-up of innumerable factors of *gestalt* dynamics, learning, social, cultural, and linguistic determinants. (82, p.123)
>
> Thus "I" and "the world," . . . are not a simple datum and primordial antithesis. They are the final outcome of a long process in biological evolution, mental development of the child, and cultural and linguistic history, wherein the perceiver is not simply a receptor of stimuli but in a very real sense *creates* this world . . . (83, p.712)

In this sense, the way we perceive nature determines the regard we have for it and the way we treat it. The Western tradition, as exemplified by landscape aesthetics, is to objectify the world, to put it at a distance. The words "distance" and "detachment" therefore lead to a much broader consideration of man-nature relationships than might be expected and, if it is not simply a semantic accident, seem to suggest some unsatisfactory consequences of the Bullough theory. For surely it is this very sundering of man from nature that precludes the flowering of Leopold's "land ethic" (3). It ensures that the non-human is regarded as a thing, devoid of all save instrumental value. It could even be seen as running counter to the motivations behind the establishment of wilderness parks and interpretive programmes. In short, it may be that the promotion of nature as a thing to be looked at poses a threat rather than a benefit to the conservation ideal.

Indeed, even the idea of the "environmental voyeur" is not an altogether facetious one. For the behavior of the voyeur sounds, at least, very much like that of the detached observer of nature.

> "Looking at" objectifies. Objectification is the second and essentially perverse action of the voyeur, along with keeping his distance. Both are closely linked together. Objectification is only possible with a keeping of distance, and, conversely, it is only the keeping of distance that makes objectification possible. . . .
>
> Thus, the voyeur does not participate in reality in any direct sense, but only by way of the objectification, i.e., reflected knowledge. He makes the Other into an object in and for itself. . . . The perversion of the voyeur, like all perversions, reveals a fundamentally different kind of attitude toward the world . . . (84, p.219)

Thus it may be that the continual objectification of nature, reinforced by frequent exposure to animal films, television, and picture postcards (the pornography of nature?), precludes the development of a loving relationship and substitutes instead a twisted and perverted one, which harms the viewer quite as much as his attitudes and actions harm the land.

If the notion of distance and objectification are similar to those terms when used in regard to aesthetics, we may indeed have cause for concern. McLuhan and Parker put it even more bluntly, singling out perspective itself as the villain, for "it is only perspective which allows for dispassionate survey and noninvolvement in the world of experience" (85, p.20). Is this what we want--noninvolvement with the world? And, if the aesthetic attitude theory of aesthetics is correct, is this a necessary consequence of any attempt to view nature aesthetically? Must it result in a "scenery cult"? If so, this seems to argue against promoting an aesthetic relationship to nature, just as Shepard did when expressing concern over the homogenizing effect of regarding the world as scenery (72).

But I must again caution that this division of the aesthetic field into two opposing camps is, while useful to demonstrate how different assumptions can lead to different conclusions about the same subject, somewhat dangerous in that it tends to make the situation seem more "black and white" than it actually is. I suggested earlier that current research concentrates on certain formalist assumptions, which I identified with Meeker's "beauty-in-object" position. But in a sense current research also has a vested interest in "distancing", since so much of it is based on the scenic viewpoint tradition that helps to isolate the viewer from the environment. One might well argue that both distancing and formalism are necessary in landscape research, or perhaps that such research takes scenes that are easily distanced and then proceeds to measure their formal properties to explain preference. But I think that at this point the discussion must begin to spill over into what is properly a philosophic concern, slightly beyond the scope of this study. I wish to make it clear that these other ideas deserve consideration, but that for present purposes the generalization proposed by Meeker is probably adequate as a point of departure.

Ignoring, then, the inter-twining of the aesthetic positions outlined, it would seem that both have at least the potential for leading us into a dilemma, if by different paths. And we are again faced with a decision about the value of aesthetics to the conservation movement. The difficulty is summed up in a statement by Beardsley:

> What I mean by the dilemma of aesthetic education is this: that we are torn between conflicting ways of redirecting taste. One is the way of love of beauty, which is limited in its range of enjoyment, *but is reformist by implication, since it seeks a world that conforms to its ideal. The other is the way of aestheticizing everything*--of taking the aesthetic point of view wherever possible--and this widens enjoyment, but is defeatist, since instead of eliminating the junkyard and the slum it tries to see them as expressive and symbolic. (86, p.56) (emphasis mine)

The first way, which Beardsley says is "reformist" since it seeks a world that conforms to its idea of perfection, is what I have been referring to as the formalist approach, although properly speaking it could apply to other theories as well. The danger that Shepard perceived is the tendency to try to make all scenery, all wild land, conform to the ideal of the picture postcard--a homogenization of the natural environment. The second possibility outlined leads to the opposite extreme, for if our attitude is the important factor in the aesthetic experience, there seems no reason why we cannot learn to find aesthetic interest in anything. And in that case, there is no justification for any kind of preservation, or for preventing any kind of development. This, in addition to the demand that the viewer be divorced from the world, makes the aesthetic attitude approach as suspect as the formalist one as a basis for investigating the importance of "aesthetic resources" in nature.

We seem to reach an impasse here, faced with Beardsley's dilemma and a set of equally unpalatable choices: continued acceptance of the formalist approach, a switch to an aesthetic attitude approach, or abandoning the study of landscape aesthetics altogether. The decision is difficult enough to justify an attempt at compromise.

5

A POSSIBLE RESOLUTION

Having examined the probable consequences of courses of action based on two rather divergent aesthetic positions, we have now to decide whether the entire pursuit is indeed a dangerous and undesirable one, or whether there is some alternative approach, perhaps conciliatory of the two already outlined, that could serve as a more promising foundation for a study of landscape aesthetics.

In the first place, we must allow the possibility of some modification to either of the original approaches that would make them more suitable. For instance, we might read something slightly different into the writing of Bullough (who, incidently, was by no means insensitive to the importance of the object in aesthetic reactions). When he speaks of distance, he might mean not a distance between the viewer and the object, but between the viewer and his everyday concerns. That is, the viewer may be entreated to step away from his own self-interest, from concern for his own well-being and his utilitarian involvements, to detach himself from his profane existence. Bullough himself says

> Distance, as I said before, is obtained by separating the object and its appeal from one's own self, by putting it out of gear with practical needs and ends. Thereby the "contemplation" of the object becomes alone possible. But this does not mean that the relation between the self and the object is broken to the extent of becoming "impersonal". (51, p.91)

This does not seem to go to the extreme of suggesting there be an empathy with the object, but if the distance is from the self, this is a possible interpretation.

The philosopher R.W. Hepburn seems to see no serious conflict between the ideas of distance and empathy. He speaks of

> . . . the degree to which the spectator can be involved in the natural aesthetic situation itself. *On occasion* he may confront natural objects as a static, disengaged observer; but far more typically the objects envelop him on all sides. . . .
>
> . . . The spectator is, of course, aesthetically detached in the sense that he is not *using* nature, manipulating it or calculating how to manipulate it. He is both actor and spectator, ingredient in the landscape and lingering upon the sensations of being thus ingredient, playing actively with nature and letting nature as it were play with him and his awareness of himself. (87, p.51)

He does not seem to feel called upon to refute the concept of aesthetic detachment, and yet speaks of a more active involvement with the aesthetic object than Bullough would, I think, permit. But this apparent contradiction is of less interest than the contentions that

> Aesthetic experience of nature may be experience of a range of emotion that the human scene by itself, untutored and unsupplemented, could not evoke . . . This is not necessarily a humanizing of nature; it may be more like a "naturizing" of the human observer. (87, p.56)

and

> A fourth class of approaches to ideals of 'unity' is concerned with what we have called the 'background' quality of emotions and attitudes, common to a great many individual experiences. Here the background is a sense of reconciliation, suspension of conflict, and of being in that sense at one with the aesthetic object. (87, p.57)

Whether or not we find the positions outlined by Hepburn convincing, it is at least interesting that he finds no need to sunder relationships between man and nature in the course of an aesthetic experience. Perhaps with this encouragement we can examine yet one more, somewhat related, approach to see if it offers any compromise to the "formalist-aesthetic attitude" conflict, and any greater promise as a basis for the study of landscape aesthetics.

A central figure in the approach we must now examine is Northrop Frye. The following statement bears some relation to those of Hepburn cited above, and serves to introduce this third type of aesthetic theory.

> At the level of ordinary consciousness the individual man is the centre of everything, surrounded on all sides by what he isn't. At the level of practical sense, or civilization, there's a human circumference, a little cultivated world with a human

> shape, fenced off from the jungle and inside the sea and the sky. But in the imagination anything goes that can be imagined, and the limit of the imagination is a totally human world. Here we recapture, in full consciousness, the original lost sense of identity with our surroundings, where there is nothing outside the mind of man, or something identical with the mind of man. (44, p.9)

One of the purposes of art, Frye says, is to help man identify with the non-human world--to shrink, rather than increase the distance between them, to make them one in the mind of man. This is certainly a different claim than we have encountered to date, but one that he is not alone in making.

In describing the opposing approaches to the aesthetics of nature--beauty in object versus beauty in beholder--Meeker used the work of Suzanne Langer (88,89) as an example of the second approach. Yet while she definitely stresses the role of the viewer, hers is not a strictly aesthetic attitude approach. It bears various labels, most commonly I think that of "expressionist". This stems from her emphasis upon the expressive value of art and aesthetic objects, their ability to express through natural symbols some concept or emotion that could not be expressed through discursive language. Like Frye, she stresses the importance of metaphor, and suggests that the artist may well express values of which he himself was not conscious. That is, the work of art is expressive, but the artist does not consciously set out to build into it some message he wishes to convey. But the message is there nonetheless, the inexpressible finds expression through natural symbolism.

This may seem to be getting rather far afield from landscape aesthetics, but not so. For we must now consider what Langer's approach would mean to the study of landscape. Of what is landscape expressive? Shepard suggested some Freudian possibilities (90) and von Franz stated that "landscapes in dreams (as well as in art) frequently symbolize an inexpressible mood" (91, p.230). But Berleant is unhappy with this prospect, for "clearly, to speak of an *object* as being expressive or as expressing something is to interpret it animistically" (92, p.31).

The thought of interpreting something animistically apparently strikes Berleant as inappropriate. But considering that it has only been since the Renaissance that western men have ceased to view nature animistically, it need not be unthinkable. Hans Jonas observed that, prior to the Renaissance, men made the obvious assumption that the world was like man--alive (93). The world is alive with sentient beings. The mystery is death. But with the rise of materialism and empiricism, the assumptions change. The world is made up of non-living particles, arranged like a giant clock-work.

Even living things are composed of inanimate particles. Death becomes the norm and the problem that needs explanation is life. Only in this context is it unusual to regard objects animistically, or to think it possible that the natural world might express something.

Obviously this question of animate versus inanimate is closely related to the problem of putting nature at a distance. It all involves the conception of man as distinct from the world around him--the antithesis of the land ethic. Yet even without going so far as to demand animism in the natural world, it should not be unthinkable that nature have expressive potential. At the very least we must allow for the possibility of symbolic value being ascribed to aspects of nature by a particular culture.

We have then an aesthetic theory which, if applied to nature, demands the presence of expression. Obviously, from this point of view the ephemeral effects are of considerable importance in that they are the most malleable and expressive. Mountains may signify power, water tranquility, but light and cloud and wind provide a stronger and larger vocabulary. Hence it is not surprising that it is these elements that are singled out by landscape artists as most important to aesthetic appreciation (see above p. 65). Nor is it surprising that these ephemerals can exert a strong modifying effect upon the preference of viewers for landscapes, even very popular landscapes (see above p.61). And it may be that regarding nature as expressive opens the way also to a kind of re-personification of nature. At least, adoption of the expressionist viewpoint makes landscape aesthetics a study of involvement with and interpretation of nature, as opposed to the stimulus-response approach of current researchers.

Allowing the viewer a role other than as a passive respondent to a given stimulus also opens the way to an approach much more positive than the identification of particular types of scene. It suggests the possibility of a new kind of "interpretive" service, something akin to art education which might engender more aesthetic responsiveness amongst the populace, and to a wider range of landforms. Hepburn maintains that "despite appearances to the contrary (the cult of the open air, caravans, camps, excursions in the family car) serious aesthetic concern with nature is today rather an unusual phenomenon" (87, p.49). He also suggests that "if there can be a passage, in art, from easy beauty to difficult and more serious beauty, there can also be such passages in aesthetic contemplation of nature" (87, p.62). In other words, there is the possibility of increasing aesthetic sensitivity to nature, to providing the viewer with a more subtle and profound experience than the simple recognition of "easy beauty"--which in plain language is what has been identified through current landscape research as the aesthetically superior in nature. The notion of increasing the sensitivity of the viewer seems consistent with the observations of Gombrich discussed earlier, and might well lead us to Leopold's conclusion that

> Recreational development is a job not of building roads into lovely country, but of building receptivity into the still unlovely human mind. (3, p.176-7)

We are no longer tempted to select one kind of land for preservation and thus risk further homogenization of the environment--although of course that possibility is not ruled out. But if we accept the probability of changes in aesthetic preferences over time, and the possibility that the concerned viewer will be able to discover different kinds of aesthetic interest in a vast range of landscape types, the suggestion that only one kind of land be preserved seems irrational. Shepard feared that

> . . . the aesthetic perception of wilderness as scenery has relegated it to the categories of space and use, to the cannons of taste. If it is fashionable today, it may be unfashionable tomorrow and is therefore without abiding value. (73, p.148)

He may of course be correct in fearing that some will seize on this variability as an argument against the need for wilderness. But this does not necessarily imply that the aesthetic perception of nature is itself dangerous, for it does not follow that the aesthetic perception of wilderness is, or need be, as scenery. Nor need it be a positive reaction. But in any event, Shepard is certainly right that aesthetic relationships are not the only ones that need to be fostered. His argument for a "sense of place" may in fact overlap with aesthetic interest if "re-personification" of nature does indeed follow. Both could lead to the re-emergence of a functional land ethic, a more personalized relationship with nature than is fostered by a materialistic society. At bottom our concern has to be with the relationship of man and nature, for as Tribe observed,

> . . . most of the crucial environmental choices confronting industrialized nations in the last third of the 20th century will be choices that significantly shape and do not merely implement those nations' values with respect to nature and wilderness. (94, p.324)

As Shepard himself commented, "the central problem of human ecology may be characterized as the relationship of mind to nature" (95, p.893). We have seen in the course of this discussion that the assumptions we bring to our relationship with nature have a considerable bearing on the kind of world we create. It is surely crucial that we satisfy ourselves that the assumptions we bring to our planning for the future do not bear within them the seeds of environmental degradation.

There is an interesting connection between the notion of re-personifying nature and the plight of landscape painting. Clark laments that

> . . . science has intervened by radically altering our concept of nature. . . . the microscope and telescope have so greatly enlarged the range of our vision that the snug, sensible nature which we can see with our own eyes has ceased to satisy our imaginations. . . But although these artists [Klee, Miro] . have refurbished their repertoire of forms from the laboratories, this does not by any means compensate for the loss of intimacy and love with which it was possible to contemplate the old anthropocentric nature. (54, p.140-1)

And to this dissociation of man from nature, he finds a solution strikingly similar to the one which arises from the assumption of an expressionist aesthetic.

> At the end of Chapter Six I said that the best hope for a continuation of landscape painting consisted in an extension of the pathetic fallacy, and the use of landscape as a focus for our own emotions. The great artists of Chiliasm, like Grünewald, were expressionists, and it is possible that the emotions of excitement and awe which this terrible new universe arouses in us will find expression in some new way as the old forest fears found expression in northern art. Ultimately our expanded concept of nature may even enrich our minds with new and beautiful images . . . (54, p.142)

The resurrection of the pathetic fallacy means a return to an expressive world, a living world with which one has the sort of relationship shared by two individuals, rather than that between a man and a thing. It means an expansion of the emotional vocabulary, so that the expression inherent in nature can be of value even to the man who never sees it, but knows it only as a "blank spot on the map".

There may be those who would agree that expressive value can be found in nature, but argue that it is assigned to nature by the culture itself. They would further argue that we may assign whatever meaning we wish, and if necessary make this "redefinition" stick through intensive advertising. This is essentially what Martin Kreiger says in his hotly debated paper "What's Wrong with Plastic Trees?" (96). Eckbo argued that "society uses technology to create a landscape which expresses the values and objectives of society" (97, p.53). In this case, we might deduce that landscape management is capable of changing natural expression into an expression of society--a sort of giant mural painted by millions of fingers dipped in ochre and green. But it is quite obvious that such a modified landscape can *never* express wildness, non-human forces. Therefore, we could conclude that management of wilderness is potentially destructive of its aesthetic potential.

This sort of conclusion would doubtless strike many planners as "impractical" (4, p.227). But the bias of those in the management and planning professions is obvious--they must operate on the assumption that modification is bound to occur (through logging, tourist facilities, hydro-electric projects and so forth). Their interest is therefore largely in cosmetic measures, in the prevention of the loss of currently valued landscapes or in the use of them to conceal less acceptable views. They are charged with preserving "scenery" without hindering forest exploitation. This implies an interest in contemporary taste, and is essentially a short-term consideration.

In contrast, our concern is with longer-term issues, and even if expressive values are culturally assigned, there is another side to the story.

Mark Sagoff, a philosopher, has attempted to show that interest in beauty, scenery, and the picturesque is misguided. To concentrate on these is to ignore the major aesthetic potential of wilderness, its symbolic import. An interest in beauty, he says, is essentially utilitarian, but "as long as the expressive qualities of an environment are in question, there are . . . grounds for agreement (98, p. 208).

Sagoff's paper is an especially important one, I think, but also one of the most difficult to summarize because it involves a sustained argument. He maintains that "the aesthetic qualities of nature are just those qualities which are described in metaphorical terms" (98, p.249), and that these metaphorical properties are every bit as much a part of the land as are its physical attributes. Here we see a different kind of emphasis on the object than was shown earlier by researchers concerned only with the formal properties of the objects. Landscape has not only colour and shape and texture but expressiveness--not a property we are accustomed to look for in objects but one which can be very properly argued to be present (61).

Furthermore, since the function of metaphor is to explain by example or paradigm some concept which defies explanation in formal discursive language, the metaphoric content of landscape is an important cultural resource. The examples or paradigms we choose as definitions of important concepts in fact define the way we think about those concepts. For example, if we use wilderness as a symbol of freedom, rather than using, say, the frost-free refrigerator as a symbol of freedom then we mean something different in the first definition than in the second. The word "freedom" ceases to exist in its former sense if we substitute the second paradigm. Therefore, he says, the metaphoric refugium of nature is a repository of many of our important cultural concepts. He goes so far as to argue that a citizen has a right to demand that these natural paradigms be preserved, for they were the paradigms upon which the particular society was built and as such represent an important part of his cultural heritage.

Some of Sagoff's own wording may make his intent clearer.

> . . . whether with the majority of Americans you read Emerson and the great slush of Romantics and thus saw Nature as the paradigm of joyful innocence and God as essentially benevolent, or you chose Melville, Hawthorne, Poe, or later, Twain, and were made aware of the ancient distances in the deep seas and dark forests, you recognized nature as an aesthetic symbol before you considered it as a utilitarian environment. In order to understand nature

> as an aesthetic symbol, you had to decide upon its metaphorical character: is it virtuous, independent, mighty, and free, or is it inimical, wrathful, and ambiguous? Now, these qualities belong to nature, if they belong at all, no less than properties of age or chromosome count: metaphorical possession is possession nonetheless. It is just that the conventions for establishing age or chromosome count are well entrenched in the history of scientific theory, while the conventions for determining metaphorical qualities are necessarily less well entrenched. An example may help. Suppose you wish to know which mountains in the United States are majestic. Why, the purple ones, of course! The point is that songs, poems, paintings, plays, and the like give us ways to converse with one another about what things are noble or majestic, great or small. If a leaf of grass is no less than the journey work of the stars, then it has a quality not reproducible by the Monsanto Corporation. The commonsense properties of an object are settled by ordinary perception--indeed, this is what makes them commonsensical; the metaphorical qualities of things are determined by the arts. No wonder the first conservationists--Audubon, Catlin, Cole, Muir, Olmstead--were not pioneers, businessmen, or politicians; they were artists. Only by recognizing the metaphorical or expressive features of nature can one understand the moral dimensions of the fact that this country has torn the wilderness down. (98, p.234)

Notice that Sagoff uses the term "metaphoric" as we have beem using the term "expressive", and that his reference to commonsense versus metaphorical properties is highly reminiscent of Northrop Frye's "levels of language"; ordinary conversation, social participation, and imagination. Frye too sees the artist as a perceiver of metaphor, a man working in the language of imagination along with all other creative persons. Whereas in Frye's theory the role of the artist involves imagining different realities from which society may choose, we might say that in Sagoff it involves perceiving metaphorical qualities which in turn define the important cultural concepts on which the society is based. Both writers therefore see the artist as in some sense an explainer or interpreter, and both seem therefore to suggest that the prime mover in the aesthetic appreciation of nature must be the artist. Clark argued that creative work in this field is swamped by a deluge of poor and imitative stereotypes which enjoy great popularity. In this sense, the artist has not had the opportunity to play his designated role simply because no one would listen. But by extending the meaning of "aesthetic" to include not just something akin to beauty but also the expressive properties of the land, there seem other modes of communication which the artist might use. Perhaps the writer has been too much ignored, or perhaps some newer medium such as photography will manage to disentangle itself from the stereotype. Certainly the landscapes of contemporary photographers do not resemble those used in the test sessions described earlier. Even those of established photographers such as Ansel Adams, who one critic actually credits with helping to establish the current stereotype in landscape, are very different.

> Photographs like that of *Mount Williamson*, with its tumbled granitic boulders and slanting cathedral illumination in the sky--as if God had accepted Adams as his art director--have been instrumental in fixing the idea of "wilderness" for two generations of Americans. Probably half the millions of frames of Tri-X and Polaroid that tourists expose in Yosemite each season are homages, conscious or not, to Adams--sentiment imitating art in the presence of nature. Just as the traveling painters of the past century like Albert Bierstadt and Thomas Moran imposed a particular vision on our ancestors, Adams has imposed his on us. (99, p.72)

Mount Williamson, incidently, is a photograph of distant mountains with cross-lighting on a foreground of boulders. From it's Shafer rating we would have predicted its rank as 75th in the test series described earlier.

But above all we must recognize that the approach of the artist need not be at all like the stereotype-hunting of the tourist; in this I think Shepard does aesthetics an injustice. Treating nature as scenery is not really what the artist does. Or at least my own experience with landscape artists leads me to think otherwise. In fact, when pressed the artist may reluctantly admit that his relationship with the land has a distinctly spiritual cast when he is working:

> The motive for metaphor, according to Wallace Stevens, is a desire to associate, and finally to identify, the human mind with what goes on outside it, because the only genuine joy you can have is in those rare moments when you feel that although we may know in part, as Paul says, we are also a part of what we know. (44, p.11)

Frye's insistence on art as a unifying experience is quite at odds with both the extreme aesthetic attitude position discussed above and with Shepard's fears about treating nature as scenery. It may be that, semantic difficulties aside, there is rather less disagreement between the artist and Shepard as to the proper relationship with the land than might first have been expected.

Sagoff concludes his discussion of the expressive in nature with a plea that we "follow the instruction of our literature, music, and art in determining the aesthetic qualities of our environment much as we follow the advice of the sciences in working out the technical problems of policy" (98, p.264). But he adds that

> The utilitarian argument is inappropriate because it distracts attention from the real motivation of the ecology movement, which is not to derive economic or recreational benefit from nature so much as to respect it for its own sake. . . . Accordingly, a different and, indeed, a nonutilitarian rationale is needed to support protectionist policies. This paper proposes such a rationale.
>
> Our proposal is this: We have an obligation to protect natural environments insofar as we respect the qualities they express. We have seen that these qualities do actually belong to some environments, which are their paradigms; and the discovery or identification of these qualities is effected in our language and by our arts. Preserving an environment may be compared to maintaining an institution, for symbols are to values as institutions are to our legal and political life. (98, p.264)

This is a considerable departure from our initial, basically utilitarian stand that aesthetic quality could be identified by measurement and used to look at--Sagoff makes it not just an item of utility but of sizable importance to the culture itself.

Notice also that Sagoff's assumptions essentially negate Krieger's argument that we can learn to love plastic trees, for even if we could, they could never *mean* the same to man because they are *not* the same--they do not have the same symbolic value. Similarly, Beardsley's fears about "aestheticizing" everything seem less ominous also, for a garbage dump, whether viewed as aesthetically interesting or not, can never express the same values as wilderness, and consequently the supposed ability to aestheticize anything cannot be used as a justification for not preserving anything.

What has essentially happened is that we have moved away from the conventional connotation of the word "aesthetic" as either anything that gives pleasure or as the beautiful, and have extended it to include a considerably higher level of cognitive function.

> What matters is to distinguish between the aesthetic experience--or the experience of beauty if you like--on the one hand, and sensory gratification on the other; and to get away from such definitions as the *Concise Oxford's* of beauty: "Combination of qualities . . . that delights the sight; combined qualities delighting the other senses", etc. Evidently, by these criteria, not only Grünewald, but the vast majority of works of art would be beyond the pale of beauty and could never give rise to aesthetic experience--defined by the *Concise Oxford Dictionary* as "the appreciation of the beautiful".
>
> I do not mean to flog the dead horse of hedonist aesthetics but to emphasize the difference between sensory gratification and aesthetic satisfaction--a difference of levels deriving from the hierarchic organization of the nervous system. (62, p.385)

One might with some justification argue that a major reason for the current, unsatisfactory concept of landscape aesthetics is the superficial interpretation of the term by current researchers and their assumption that it applies to any kind of sensory gratification (provided of course that it is a pleasant sensation). A passing acquaintance with any of the arts would be sufficient to falsify the latter point at least, for there is certainly no shortage of unpleasantness or ugliness even in great works of art. The expressive theory of aesthetics does not demand that the values expressed be of one kind--hence, the negative response to mountains discussed earlier does not necessarlly mean that the response of those people was not aesthetic. They may still have been moved by an aesthetic experience, but not in the same way that we are today. This may be of some importance to students of the Canadian relationship to nature, given this country's history of negative attitudes towards wilderness in contrast with those of the United States (80,100,101). In any event, it may well be that many of the undesirable consequences arising from the current approach to landscape aesthetics could be avoided or at least minimized if the more substantial interpretations of aesthetics were employed. In doing this we would escape the puerile search for objects which have "easy beauty" as well as the desperate surrender to the notion that the viewer can find this for himself regardless of the quality of the environment. The more substantial concept of aesthetics demands instead an active interplay between a complex environment and an involved viewer who seeks aesthetic experience in an ever more mature manner. It is the difference between trying to catch an animal to put in a cage to look at, and trying to catch an ecosystem. The most one can hope to capture of the latter is a glimmer of understanding, a glimpse of beauty; and that is enough.

6

CONCLUSION

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The approach to the quantification of landscape aesthetics that was taken at the beginning of this study seemed entirely reasonable given the unspoken assumptions that were being embraced. We have subsequently seen that those assumptions are not at all self-evident, and that there may in fact be unfortunate consequences to acting on them. We must at least conclude that, given the variability of public taste in landscape, there can be no justification for setting aside the currently valued variety on the grounds it is to be kept for posterity. Posterity can only be served if it is allowed to make its own selection, and our only responsible recommendation can be the preservation of diversity. It may be then that the aesthetic well-being of future generations coincides exactly with their biological well-being. Ecologists have for some time advocated the establishment of reserves of every kind of ecosystem as a hedge against the day when our monocultured crops fail and we are left with a genetically bankrupt world. The preservation of genetic diversity in ecological reserves seems the only intelligent safeguard against this probability.

> Why, indeed, must Nature be preserved? This question has been answered in detail so many times by others--biological diversity as a basis of long range ecological stability; genetic diversity as the necessary concommittant of continuing evolution (including gene preservation for future crop breeding options); and that vast uncharted New Wrold of aesthetic diversity . . . (102, p.5)

The ends of human survival and human aesthetic enjoyment may thus be served by the same goal: the strenuous resistance of anything that threatens to further homogenize our world.

There is still another argument for this sort of preservation, one concerned with the effect on the individual of an increasingly simplified world. Rosenzweig's oft-cited work on rat development (103) demonstrated an actual increase in brain size in animals reared in complex, stimulating environments (complex, incidently, is not a synonym for complicated, which is what our cities often are (104)). Edith Cobb's study of the biographies of articulate men discerned an emphasis on complexity in childhood, and frequently on a deep involvement with nature (105). Shepard stressed the importance of a complex world for the overall well-being of society (72), and Karl Menninger commented that "psychiatrists plead for wilderness areas, not for the preservation of beauty but for the preservation of mental health" (106, p.404). And of course Sagoff has argued that the welfare of our institutions may depend in part on the well-being of the natural symbols from which they draw their definition--"the destruction of symbols is a step towards ignorance of the qualities those symbols express" (98, p.259).

So on three counts at least--societal health, ecological wisdom and aesthetic enrichment--we are admonished to work for the preservation of as complex and diversified a biosphere as possible. Shepard, as noted earlier, cautioned that regarding nature as scenery promotes the opposite, a monoculture of aesthetic forms. We have seen that the current, well-intentioned attempts at measuring aesthetic merit in landscapes might accelerate that trend. We have also examined the possibility that an alternative approach to the problem might spare us the conclusion that aesthetics is an altogether inappropriate and possibly dangerous exercise. And finally we have seen that, regardless of our understanding of the problems of aesthetics, the only safeguard that can prevent serious mistakes in the choice of natural areas for preservation is the one we ought to be embracing for purely ecological reasons--the preservation of diversity.

This may be a bitter pill for the land manager or planner to swallow, even though implementation would seem straightforward enough. For one thing, it is not likely to be as formidable an argument with politicians as aesthetic measurements would be. And for another, what we are essentially asking is that the planner stop planning, or plan not to plan.

Charles Konigsberg, Commissioner of Land Use Planning for Alaska, has referred to

> . . . a *bias inherent in* our planning process, indeed in the concept of "planning" itself . . . that bias being an underlying committment, in its various forms, to what we have come to call development, or "growth and progress" (in the western mould). (107, p.2)

> For us, of course, planning means *doing something* to and with something--virtually never to leave it be, as it is . . . Our planning, again, is filled with bias throughout. (107, p.3)

The address from which these fragments come was entitled "Planning for Quality". In it, Konigsberg proclaims himself against the attempt to quantify intangibles. For, he says, ". . . to quantify and monetize the heretofore intangible value is, in effect, to *deny* the qualities being measured, the very qualities which give it distinctive value" (108). A rather surprising statement, coming from someone actually involved in the planning process. Equally interesting is his suggestion for improving current planning models.

> Is there a pattern or model from which we can learn better how to "plan for quality"? Yes, there *is*: the pattern, the model of the natural world. It is our *only successful* model. (108)

It is apparently conceivable that the planning profession can come to the realization that there is a time not to plan, a time to leave well enough alone. We began this discussion in search of a planning tool; we find instead that planning is a part of the problem we wished to solve, through its fundamental and unspoken assumptions and goals. We are left to press home our only recommendation, that the well-being of the "resource" we wish to husband depends on our ability to leave it alone.

This need not be considered a negative conclusion. Rather, it is an attempt to broaden the scope of the study being undertaken, with room for some rather different approaches that may be more in keeping with ecological wisdom than is the one presently in fashion. That at least, is a positive aspiration. The intent throughout has been to engage in an eclectic consideration of the possible approaches to the aesthetics of nature and to the varying consequences of the respective theories. One certainly cannot, at this time at least, pretend that any one approach is certain to be confirmed as the "best"; but one can at least make a guess as to the consequences of some, and request that consideration proceed on a number of differing assumptions rather than on one alone. The choice we eventually make may be very significant, for the decisions we make now are in a real sense irreversible. Our situation is not unlike a society told that it must vote now on the paintings which will be housed in its public galleries. They are told they can keep only a few paintings, that those not selected will be turned into tablecloths, and that no new ones will ever be added to that collection. Obviously the decision would be an important one. And it is even more important in the game we now play with our remaining wilderness areas. To force selection of a few areas for preservation, and to sanctify the vote of a portion of contemporary society as justification for passing only those fragments of a luxuriant past on to our offspring is a remarkable conceit. I submit therefore that the assumptions we carry with us in the study of landscape aesthetics are not a trivial concern. It is a study which surely deserves as thoughtful and diverse an approach as can be mustered. There can be no excuse for complacent acceptance of the very values, assumptions, and relationships with the natural world that have placed us in the midst of what we popularly know as the "ecological crisis". We see all around us the effects of reductionism, not least of all that intellectual reductionism that sees only one possible relationship between man and nature, that of master and servant or worse, master and object. We need to be certain that our propensity to think in this manner does not lead to consequences for our "aesthetic objects" or "aesthetic resources" similar to those of our maimed biosphere. The subject of our investigation, and indeed the natural world itself, deserves as full a range of theoretical consideration as we can devise before, not after, we attempt to mould the remainder of our natural environment into its final form. Work progresses on the assumption that we know what is aesthetically outstanding in nature. In fact, the investigation has only begun.

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APPENDIX A

Details of the empirical investigation
discussed above, pages 15-37

INTRODUCTION

The objectives of the investigation were these:

- to identify from a range of landscapes the ones most strongly favoured by a sample of the populace.

- to determine what differences in preference, if any, exist in that sample and, by extrapolation, the populace.

- to determine whether or not these differences are associated with the backgrounds of the subjects.

- to determine whether or not preferences are based on aesthetic criteria.

- to devise a method by which to predict preferences in landscape. Concurrent with this objective is the attempt to identify which elements in the landscape are most important in determining attractiveness.

To achieve these goals, a sample of the populace was polled to ascertain its preferences, and background information was collected to permit a search for details correlating with differences in preferences. The ratings assigned to various scenes by the test group were then correlated with various measurements of the scenes to find an adequate method of prediction. Details of the test proceedures follow.

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METHODS

(a) - collection of test slides.

Between May 1973 and September 1974, a collection of landscape photographs was made. The intent was to include as broad a range of landscape types as was possible, a task favoured by the topography and settlement patterns in the province of Alberta. The area searched was roughly that lying between Edmonton and the Montana border to the south, and between the Saskatchewan and British Columbia borders on the east and west. Photographs were made with a Nikon F2 camera equipped with a 55mm Micro-Nikkor lens and Kodachrome II film. From the total collection, 80 transparencies were finally selected, representing a range of landforms from flat prairie to the Rocky Mountains and from agricultural land to wilderness (if land viewed from the National Parks roads can be said to be wilderness; it certainly appears to be in photographs, which is the salient point).

(b) - test sessions.

A projection room was obtained which permitted the exclusion of all projector noise. Slides could be viewed by means of a rear-projection screen incorporated into one wall, with the projector housed in a booth behind. Viewers could thus be seated in comfortable chairs in a room with low (rheostat controlled) lighting and no distracting noises.

Subjects for the main test were obtained through advertisements posted on the campus of the University of Alberta asking for volunteers in a study of landscape preferences. The advertisement stated that testing would take approximately two hours and that volunteers woud be paid $5.00 for their assistance. Twelve different sessions were scheduled during the winter of 1974-75, and volunteers were free to choose a time suitable to them. Initial response was good, but interest declined sharply and the last few sessions were poorly attended. A total of 61 volunteers (32 males and 29 females) were obtained, most of them university students. Ages ranged from 18 to 34 (mean age = 22.2), and the areas of major interest varied greatly (Table 1).

(i) - background information

At the time the volunteers selected a session, they were given a set of questionnaires to complete. This included a Strong Vocational Interest test (available from Testscor, 2312 Snelling Ave, Minneapolis) and an inventory of background details. The latter included the following information:

- age
- sex
- marital status
- occupation (if student, area of major interest)
- where lived while growing up (geographic location)
- where live now
- size of community (a)grew up in (b)live in now:
  - rural
  - less than 10,000
  - 10,000 - 50,000
  - 50,000 - 100,000
  - over 100,000
- type of housing (a)while growing up (b)now:
  - private house
  - duplex or condominium
  - low-rise appartment
  - high-rise appartment
- approximate income of major income-earner in family:
  - less than $5,000/year
  - $5,000 - $10,000
  - $10,000 - $15,000
  - $15,000 - $20,000
  - $20,000 - $30,000
  - over $30,000
- years of formal education
- frequency of National Park visitation:
  - frequently
  - occasionally
  - seldom
  - never
- activities participated in when visiting National Parks
- main reason for visiting a National Park
- activities thought unsuitable in a National Park

These details were collected in part to permit comparison with studies of park utilization, which often deal with socio-economic groups, but primarily to provide a group of items which might correlate with differences between individuals in landscape preferences. The Strong Vocational Interest test was included on the advice of clinical psychologists who thought it the most easily used

Table 1 - Areas of major interest of test subjects

- art (2)
- plant science (1)
- agriculture (4)
- physics (5)
- geography (7)
- commerce (2)
- engineering (4)
- speech pathology (1)
- biology (6)
- rehabilitation med. (1)
- recreation (1)
- law (1)
- chemistry (1)
- music (1)
- english (1)
- general science (1)
- anthropology (2)
- secretarial (1)
- home economics (1)
- psychology (3)
- classics (1)
- french (2)
- political science (1)
- forestry (2)
- education:
  - english (1)
  - science (1)
  - early childhood (1)
  - french (1)
  - art (1)
- unspecified (4)

paper-and-pencil test that might provide a set of useful information. These tests were obtained and scored through the University of Alberta Student Counselling Services, whose assistance is gratefully acknowledged.

(ii) - testing procedure

The procedure followed was similar to that described by Craik (22). At the time of the viewing of slides, volunteers were told that the objective of the study was to determine what kinds of land people find particularly attractive. They were told that they would be shown a series of slides of Alberta landscapes and that there would be no urban scenes or pictures of especially unpleasant sites (such as garbage dumps). They were then shown a preview of ten slides and asked to imagine themselves actually at the site and to mentally rate the attractiveness of each scene on a scale of one (strong dislike) to seven (strong preference). They were cautioned to rate the landscape itself, not the slide.

After this sample, the test was begun. Viewers were provided with a sheet of paper bearing spaces numbered from 1 to 80, and were asked to record their ratings next to the appropriate slide number. The testing was begun at a different point in the slide series for each session so as to minimize any discrepancies arising from initial uncertainty or fatigue near the end. Viewers were asked to record their first impressions, a request enforced by a fairly rapid pace of slide change (approximately once every five seconds).

(iii) - replicate slides

To determine whether or not differing atmospheric conditions, lighting conditions, or seasons--in short, features not related to the morphology of the landscape--could exert an influence on the ratings given a particular scene, several replicates were included in the test series. Photographs were taken in as close as possible to the exact position, with the only major variant being the ephemeral effects noted above. In four instances, two slides of the same scene were included. In two instances, three slides were used. Amongst the duplicate sets, the primary difference was the sky (sunny and bright versus overcast); in the triplicate sets season or lighting angle also varied.

(iv) - aesthetic adjective tests

After all eighty slides had been viewed and rated, the subjects were asked to perform a second task on twenty of the slides. They were given sheets bearing a set of adjectives and were asked to select the seven words they thought were most appropriate to the scene in question. They were told that, if the adjectives provided were not deemed suitable, they could substitute words of their own. The intent of this procedure is discussed in the text (p. 45) and the adjectives provided are presented in Table 3 of the text. These terms were randomly mixed on the page, positive and negative, aesthetic and non-aesthetic, so that the location on the list would not be an influential factor.

As a back-up to this test, to see if the results found were indicative of what might be expected in the community at large, a questionnaire was sent out to randomly selected residents of Edmonton. Of 1000 questionnaires sent out, 191 were returned. The questionnaire sought the same background information as outlined above and provided six black-and-white scenes for rating. Participants were asked, like the test group, to rate the scenes on a scale of one to seven and to select seven adjectives for each scene.

(v) - consistency check

After the adjective test had been completed, the subjects were asked to once again assign a rating to all 80 slides. This was intended as a test of the consistency of the subjects' ratings.

(vi) - solicitation of "expert" ratings

The same slides shown to the test subjects were also shown to five "experts", men with a demonstrated aesthetic interest in the landscape. To get these responses it was necessary to take the slides to the working place of the expert, where they were shown on a portable rear-projection screen. Slides were shown only once, and the adjective test was not imposed on these participants for fear of losing their cooperation (the adjective test required the better part of an hour to complete).

(vii) - development of a predictive tool

In an attempt to devise a simple measurement system that would permit accurate prediction of the preferences observed in the test sessions, a set of landscape factors was established and the degree to which each was present in each scene recorded. The set is outlined in Table 1 of the text, and the application of both this predictive measure and the one devised by Shafer *et al* is discussed above (p. 15-37).

RESULTS AND ANALYSIS

Results from all the procedures detailed in the preceding section were transposed to IBM cards for analysis. Statistical analyses were in most instances those contained in the Statistical Package for the Social Sciences (2nd edition, McGraw Hill, New York).

(a) preferences

Mean ratings for the test scenes ranged from a low of 2.770 to a high of 6.475, with an overall mean of 4.702 (Std. Dev. = 0.780).

(b) level of agreement

As mentioned in the preceding section, a considerable amout of background information was accumulated to help explain the differences in preferences that were anticipated. However, the very high level of agreement indicated by analysis of variance negates the value of this ancillary data ($p<.00005$).

(c) correlation of landscape features with test group preferences.

(i) The correlation of the various classifications outlined above with the actual preferences for test scenes, as well as the relative importance of each landscape feature, is indicated in Table 2 of the text. In Table 2 below, the same factors are compared by means of Spearman's rank order correlation.

It is possible that the correlations given for the Shafer prediction should be slightly higher. There is one scene which yields an eccentric Y value (-634), and this evidently has a substantial effect on the overall correlation. With this scene excluded, the computed value of Pearson's r becomes 0.5168 ($p<.001$) and it explains 26.71% of the variance; for mountain scenes only, Pearson's $r = 0.2755$ ($p=.055$) and 7.589% of the variance is explained. Since this scene appears to present no problems for the other predictors tested, it is not excluded from the calculations presented. The scene itself is of a mountain partly enshrouded in mist. It is unusual, thanks to the atmospheric effect, but there seems no obvious reason for the eccentric rating. The fact that this one scene can have a noticable effect on the overall correlation does caution against uncritical use of any photograph with the Shafer system. It also raises some question about the appropriateness of selecting features for a predictive system through factor analysis of a particular set of photographs, expecially in view of "the well-known phenomenon of factor-

Table 2 - Correlation of landscape factors with test group preferences

factor	*Spearman's coefficient*	*significance*
landform	0.7588	.001
focal composition	0.4319	.001
distance	0.0063	.478
observer position	0.3583	.001
panorama	0.3254	.002
light angle	0.1284	.128
cloud cover	0.0735	.259
wildness	0.7104	.001
feature composition	0.4685	.001
colour perspective	0.0132	.454

analytic research producing factors overly unique to the particular display, population sampled, and so forth" (19, p.488). The fact that the range of Y values obtained with the test scenes of this study is rather different from those obtained by Shafer (-634 to 200, mean = 118 as compared with 71 to 228, mean = 150) suggests that this might indeed be a problem. Perhaps it would be best if limitations were placed on the weather conditions for photographs to be used in the Shafer analysis, although it seems unfortunate to have to reject a demonstrably significant aesthetic factor (see Table 4 in text).

There is yet another problem connected with the Shafer method, arising from the fact that the confidence interval surrounding the regression line is so large (Fig. 1). This means that there is a wide range of values that could be predicted for a particular scene. Thus while the association tests indicate a good agreement between actual and predicted rank order, there is no guarantee that the rank of a particular scene can, as Shafer implies, be accurately predicted. The problem is even more acute in the case of mountain scenes alone (Fig. 4). The other two predictive systems have narrower confidence intervals, and so the chance of accurate prediction of individual scenes is somewhat better (Figs. 2,3,5,6). This is clearly an important consideration for any system that purports to be a tool for the identification of aesthetically superior landscapes.

Figure 1

Comparison of the observed rank order of slides with the one predicted by the Shafer method.

The points plotted indicate the predicted and actual ranks for each slide--the one predicted to rank 1st, for example, actually ranks 61st.

The solid black line is the regression line. (Y = 13.973 + 0.66476X)

The lighter lines flanking the regression line indicate the 95% confidence interval (every second point plotted).

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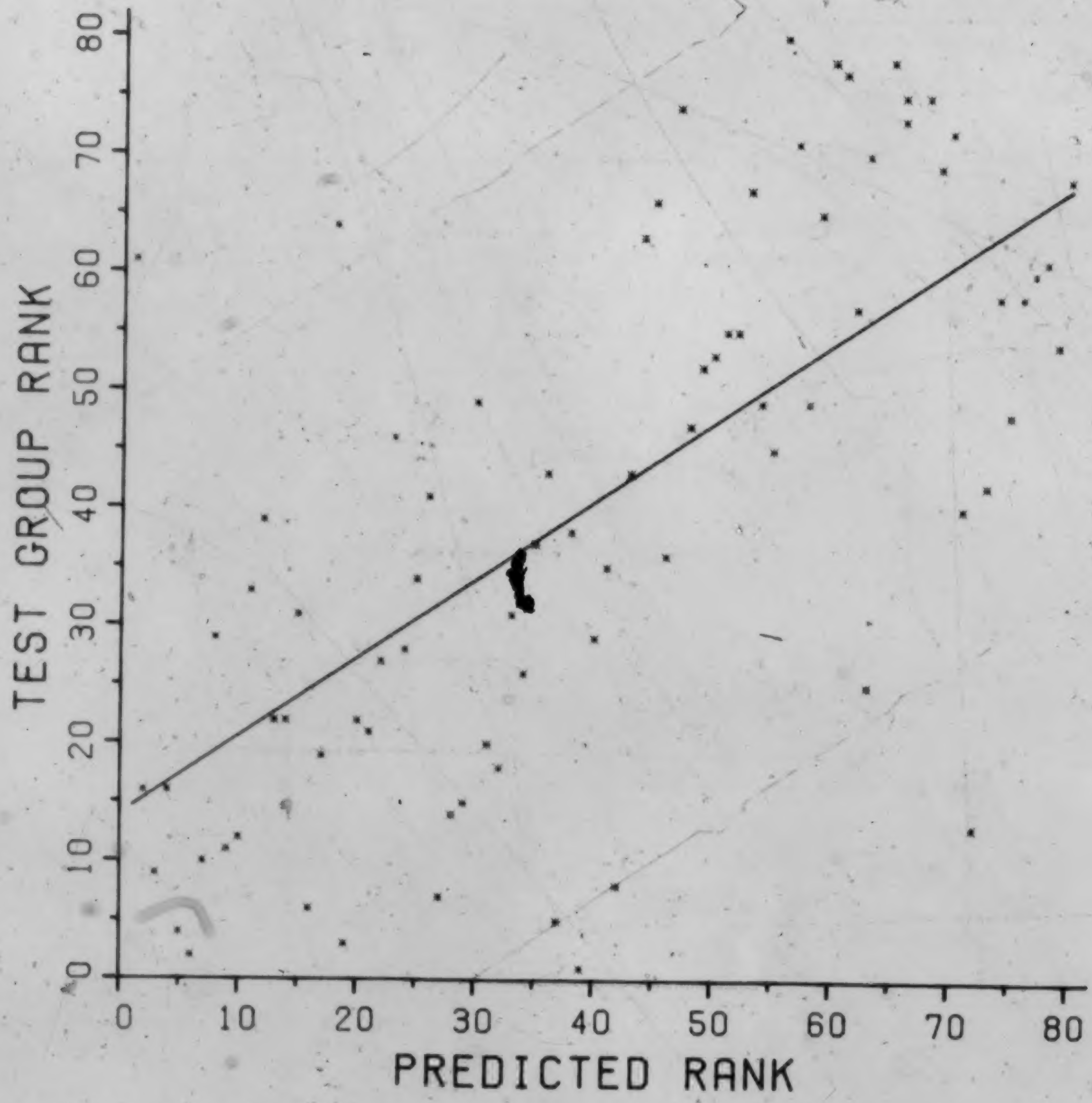

TEST GROUP RANK
0
10
20
30
40
50
60
70
80
PREDICTED RANK
0
10
20
30
40
50
60
70
80

Figure 2

Comparison of the observed rank order of slides with the one predicted by the Index (points as in Fig. 1).

$(Y = 10.035 + 0.78334X)$

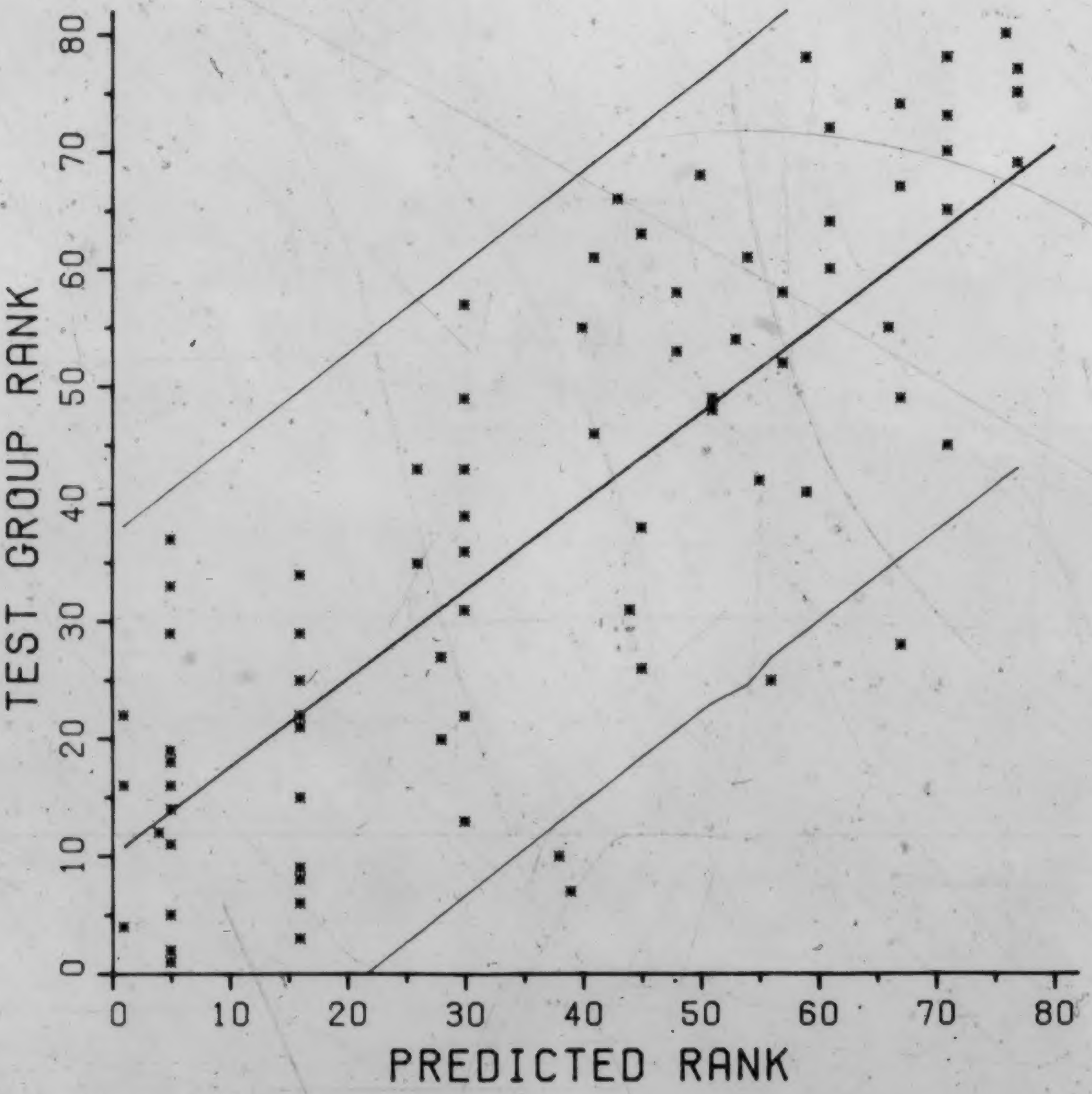

TEST GROUP RANK
PREDICTED RANK
0
10
20
30
40
50
60
70
80
0
10
20
30
40
50
60
70
80

Figure 3

Comparison of the observed rank order of slides with the one predicted by Graphic Analysis (points as in Fig. 1).

$(Y = 3.0748 + 0.966227X)$

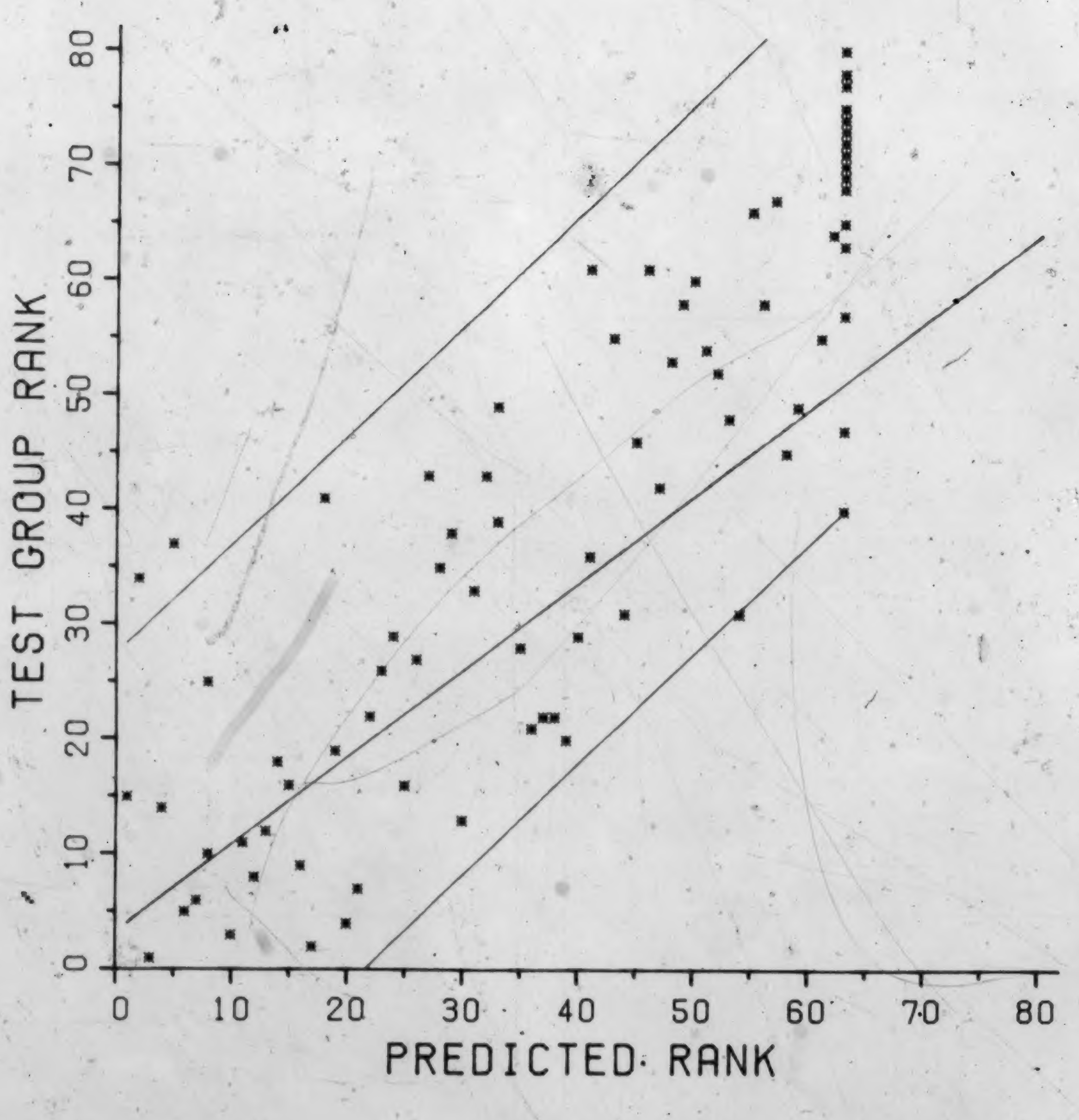

TEST GROUP RANK
0
10
20
30
40
50
60
70
80
0
10
20
30
40
50
60
70
80
PREDICTED RANK

Figure 4

Comparison of the observed rank order of mountain slides with the one predicted by the Shafer method (points as in Fig. 1).

(Y = 13.414 + 0.2749X)

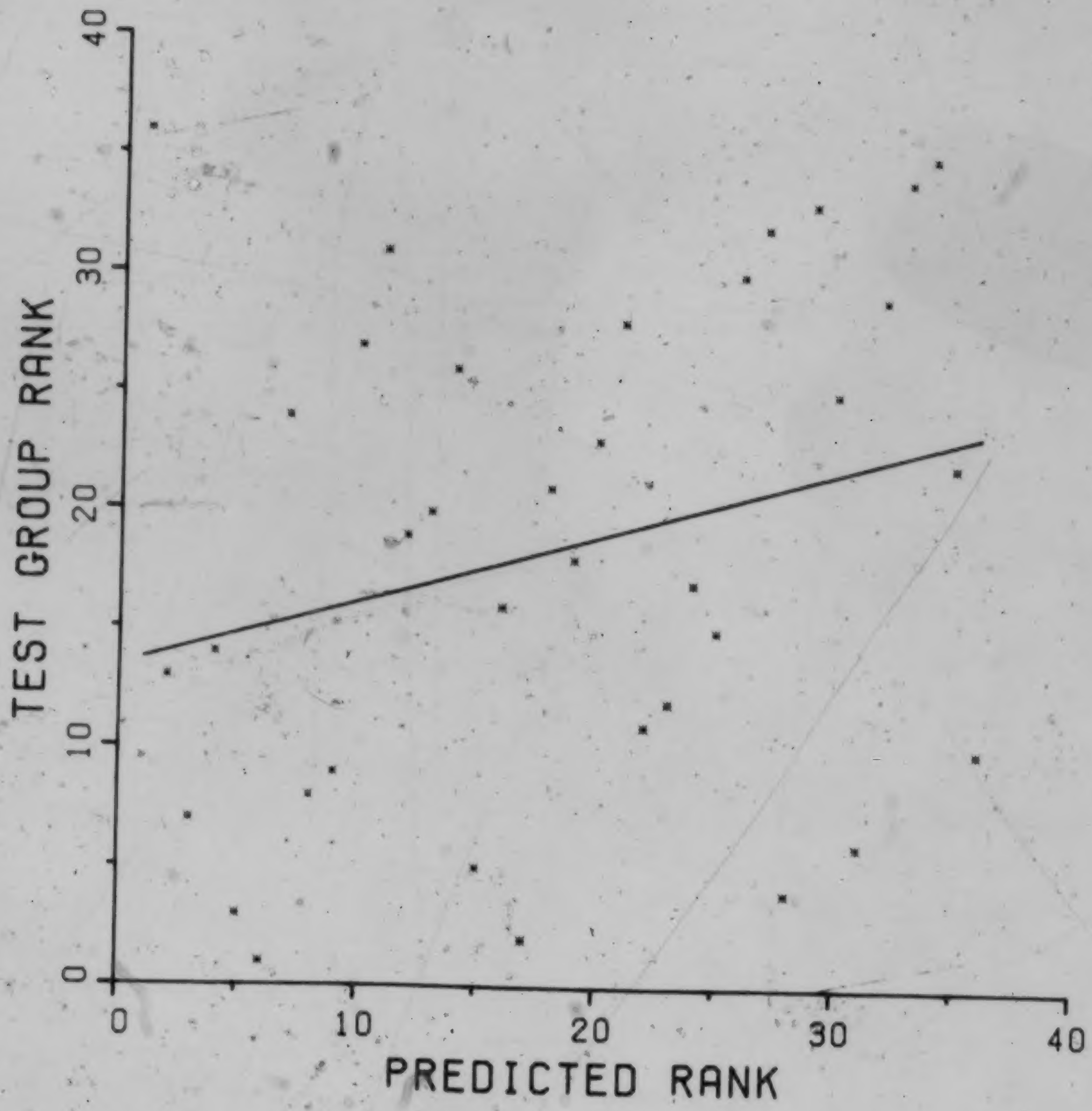

TEST GROUP RANK
PREDICTED RANK
0
10
20
30
40
0
10
20
30
40

Figure 5

Comparison of the observed rank order of mountain slides with the one predicted by the Index (points as in Fig. 1).

$(Y = 10.246 + 0.55645X)$

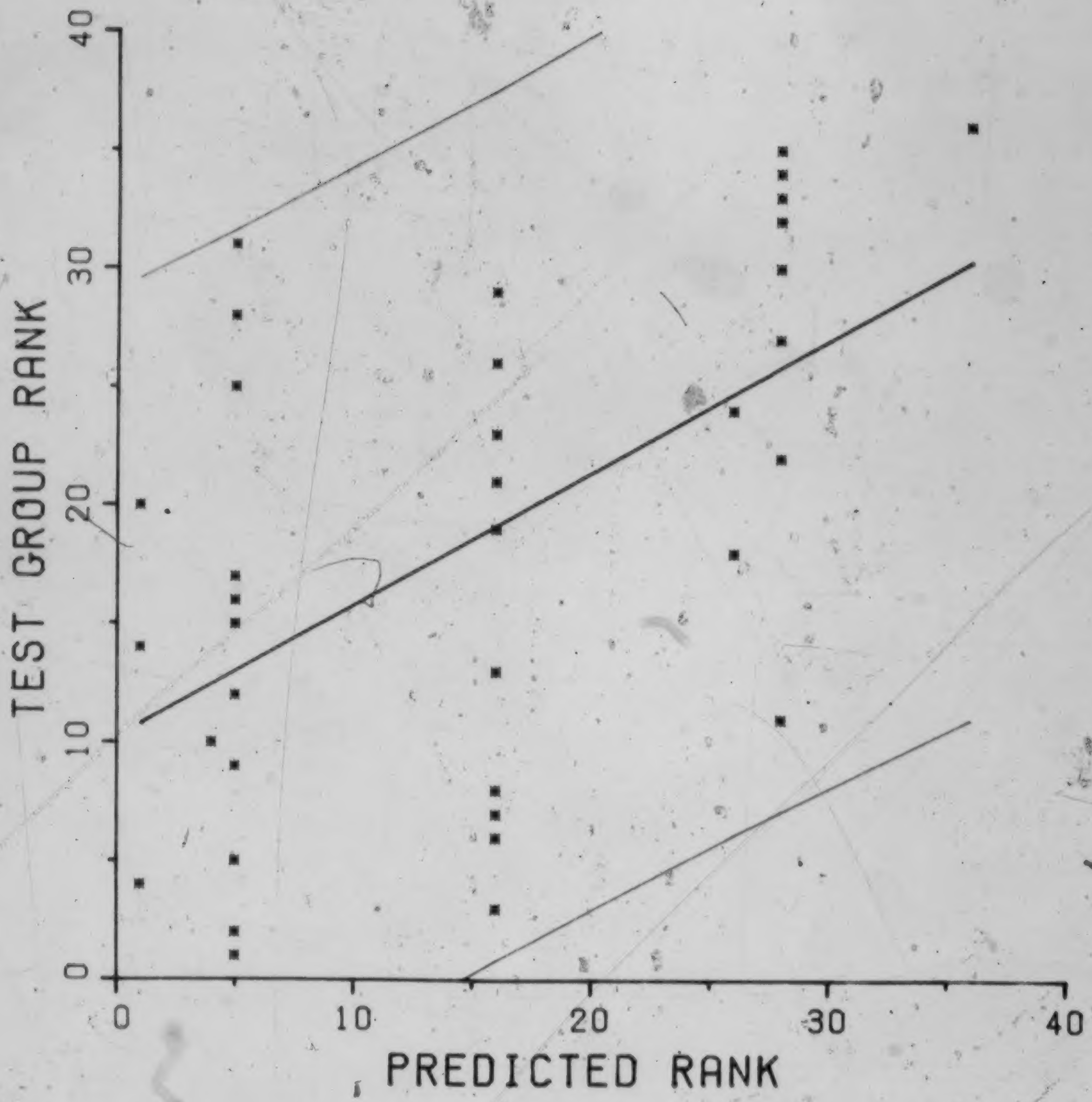
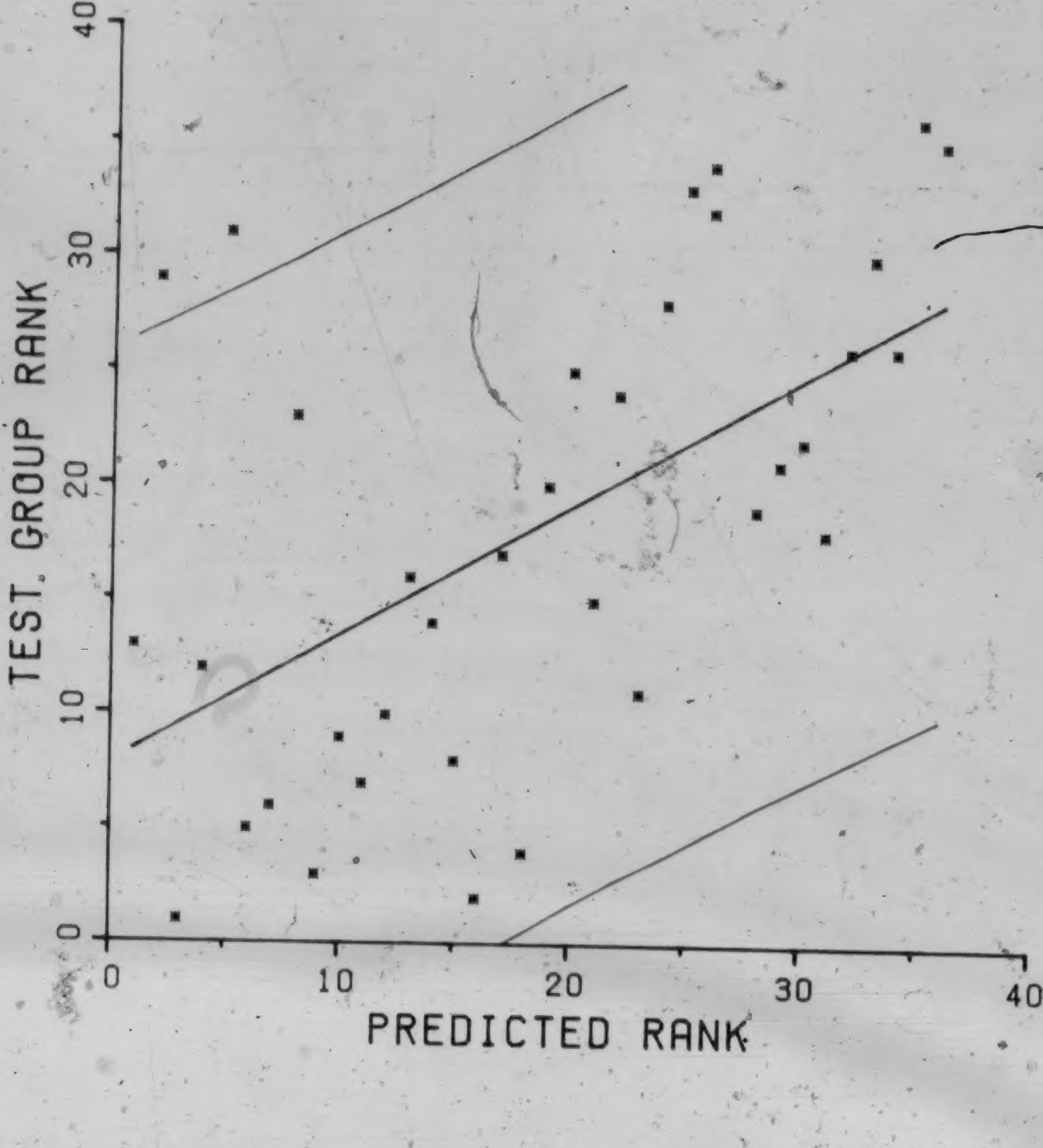

TEST GROUP RANK
0
10
20
30
40
PREDICTED RANK
0
10
20
30
40

Figure 6

Comparison of the observed rank order of mountain slides with the one predicted by Graphic Analysis (points as in Fig. 1).

$(Y = 7.7924 + 0.56312X)$


TEST GROUP RANK
PREDICTED RANK
0
10
20
30
40
0
10
20
30
40

(ii) Since one of the studies used as a model relies on chi-square tests rather than correlation coefficients (22), chi-square statistics are also presented here*. Results are simiar and indicate that landform, wildness, focal composition and feature composition are the most important elements in the prediction of preferences.

(iii) By use of the four top items in a multiple regression, an "Index" is produced which correlates well with preferences ($r = 0.8207$, $p < .001$). The formula for this index is:

Index = $2.00246 + 0.11467\,X_1 + 0.24273\,X_2 + 0.36120\,X_3 + 0.35675\,X_4$, where X_1 = landform, X_2 = wildness, X_3 = focal composition and X_4 = feature composition.

(iv) Finally, the method of measuring the similarity of scenes to typical landscape paintings (described in text, pp 77-82) yields a correlation of $r = 0.8415$ ($p < .001$). The efficiency of all three "systems" tested--Shafer, Index, and this Graphic Analysis--is demonstrated in Table 4. Table 5 gives the same information for the public questionnaire data.

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* (the test slide series was divided into four groups to facilitate this)

Table 3 - Chi-square analysis of the relationship of each landscape factor to preference

factor	*chi-square*	*(d.f.)*	*significance*
landform	61.52	(12)	0.00005
focal comp.	21.72	(6)	0.0014
distance	12.47	(6)	0.0523
observer pos.	11.17	(3)	0.0109
panorama	14.81	(6)	0.0218
light angle	3.07	(6)	0.8004
cloud cover	17.16	(15)	0.3097
wildness	63.30	(15)	0.00005
feature comp.	31.47	(6)	0.00005
colour persp.	.67	(3)	0.8799

Table 4 - Correlation of observed and predicted values by three systems

System	Pearson's r	variance explained	Spearman's corr.
Shafer	-0.3182 (p=.002)	10.12%	-0.6952 (p<.001)
Index	0.8207 (p<.001)	67.36%	0.8240 (p<.001)
Graphic Analysis	0.8407 (p<.001)	70.68	0.8694 (p<.001)

Table 5 - Correlation of observed public questionnaire preferences and those predicted by three systems

System	Pearson's r	Spearman's corr.
Shafer	-0.6092 (p=.100)	-0.3714 (p=.234)
Index	0.8027 (p=.027)	0.8857 (p=.009)
Graphic Analysis	0.8761 (p=.011)	0.8857 (p=.009)

(v) There is a strong possibility that many of the factors singled out above are in fact measuring the same property in a slightly different way. For instance, mountainous terrain will probably go hand-in-glove with "wildness" and "focal" or "feature" composition. Some indication of the degree of overlap can be had by doing a partial correlation, controlling for each factor in turn. If, for instance, "wildness" is measuring the same thing as "landform", its significance should disappear when "landform" is controlled for. Detailed results, given in Table 6, indicate that the systems "index" and "graphic analysis" retain a very high level of significance throughout, no matter what factor is controlled for. The various factors included in the calculation of the "index" (landform, wildness, focal composition and feature composition) also fare well.

(d) accuracy of predictive systems within the favoured "mountainous" category.

The accuracy of predictive systems, which in large part seem to tell us that people prefer mountainous landscape to all others, declines when we attempt to predict preferences amongst landscapes that all contain mountains. The relative abilities of the various systems in this situation are indicated in Table 7.

Table 6 - Partial correlations with test group preferences, controlling for each landscape factor and measurement system in turn

Controlling for:	land.	focal	dist.	obs.	pan.	light	cloud	wild.	feat.	colour	Shafer	Index	Graph.
landform		.2170	.0370	.1313	.0689	.2211	.3206	.2548	.1870	-.0608	-.0497	.4903	.6355
(p =)		.027	.373	.124	.273	.025	.002	.012	.049	.297	.332	.001	.001
focal composition	.6962		-.1001	.1789	.0742	.1160	.0816	.6796	.6064	.0153	-.2547	.7676	.7985
	.001		.190	.057	.258	.154	.237	.001	.001	.447	.012	.001	.001
distance	.7555	.4618		.3638	.3146	.1317	.0926	.7230	.4896	.0191	-.3184	.8216	.8434
	.001	.001		.001	.002	.124	.208	.001	.001	.434	.002	.001	.001
observer position	.7156	.3369	.0112		.0191	.1924	.1461	.6680	.4878	.1027	-.2358	.7903	.8182
	.001	.001	.461		.434	.045	.099	.001	.001	.184	.018	.001	.001
panorama	.7262	.3557	-.0645	.2032		.1822	.1891	.6862	.5238	.1163	-.2417	.7999	.8264
	.001	.001	.286	.036		.054	.048	.001	.001	.154	.016	.001	.001
light angle	.7642	.4496	-.0025	.3868	.3313		.0290	.7369	.4837	-.0206	-.3330	.8280	.8423
	.001	.001	.491	.001	.001		.400	.001	.001	.428	.001	.001	.001
cloud cover	.7818	.4516	-.0146	.3789	.3467	.0994		.7268	.4934	-.0211	-.3347	.8323	.8449
	.001	.001	.449	.001	.001	.192		.001	.001	.427	.001	.001	.001
wildness	.4211	.3528	.1511	.1266	.1404	.2840	.2058		.3322	-.0849	-.0780	.5759	.6828
	.001	.001	.092	.113	.109	.006	.034		.001	.228	.247	.001	.001
feature composition	.6757	.5845	.0623	.3655	.3738	.1169	.1305	.6563		-.0101	-.2560	.7565	.8039
	.001	.001	.293	.001	.001	.152	.126	.001		.465	.011	.001	.001
colour perspective	.7561	.4530	-.0035	.3756	.3273	.1320	.0920	.7176	.4864		-.3180	.8225	.8407
	.001	.001	.488	.001	.002	.123	.210	.001	.001		.002	.001	.001
Shafer method	.7232	.4162	.0124	.2966	.2283	.1672	.1424	.6781	.4544	.0157		.7981	.8236
	.001	.001	.457	.004	.022	.070	.105	.001	.001	.445		.001	.001
Index	-.0000	-.0000	.0668	-.0461	-.0393	.2316	.2581	-.0000	-.0000	-.0971	.0188		.5414
	.500	.500	.279	.343	.365	.020	.011	.500	.500	.197	.435		.001
Graphic Analysis	.3553	.0958	.1231	.1468	.1469	.1615	.1600	.3327	.2812	.0155	-.1188	.4615	
	.001	.201	.140	.098	.098	.077	.056	.001	.006	.446	.148	.001	

Table 7 - Correlations of preferences for mountain scenes with those predicted by three systems.

System	*Pearson's r*	*% variance explained*	*Spearman's corr.*
Shafer	-0.1274 (p=.229)	1.624	-0.1524 (p=.187)
Index	0.5511 (p<.001)	30.304	0.5604 (p<.001)
Graphic Analysis	0.6247 (p<.001)	39.020	0.5710 (p<.001)

(e) replicate slides

The need for testing replicate slides is discussed in the text (p. 60-64) and the results summarized in Table 4 of the text. Significant differences were found, indicating that ephemeral factors are indeed of importance.

(f) aesthetic adjectives

There was no indication of strong selection of either aesthetic or non-aesthetic terms. The mean number of aesthetic adjectives used by the test group was 2.88 (range 2.295 to 3.393); in the public questionnaire, it was 2.708 (range 2.505 to 2.802).

(g) experts

Analysis of variance indicates a very low level of agreement between the five experts tested (p=.3905). The degree of agreement between each expert and the test group is presented in Table 6 of the text.

Table 8 attempts to demonstrate the relative importance of several factors to the likes and dislikes of the test group and the individual experts. For the test group, the top and bottom ten slides are summarized; that is, the mean value of each of the factors for that group of slides is presented. For the experts, the "high" group of slides for each is the entire group of slides which received the highest rating (except for one expert who had only one scene rated 7; in that case the top two categories (ratings 6 and 7) were combined). Similarly, the "low" group was made up of the lowest rated slides. Note that there is no clear preference for any landform in the case of most experts, whereas the test group highly favours mountains. Table 9 has the same format but shows the mean calculated values of the three predictive systems for high and low groups of slides. Note that the experts very often show the reverse of the expected rating.

Table 8 - The relative importance of several factors in the constitution of "high" and "low" rated scenes for the test group and individual experts

factors	*mean values: test group*	*mean values: experts*				
		1.	*2.*	*3.*	*4.*	*5.*
landform (high)	4.70	5.0	2.79	2.0	3.0	2.33
(low)	1.40	1.22	4.19	4.8	3.63	3.0
focal comp.	1.9	3.0	1.46	1.0	1.67	2.0
	1.1	1.11	1.69	2.4	1.13	1.33
observer pos.	1.2	1.33	0.42	0.0	0.67	0.67
	0.0	0.0	0.63	1.6	0.75	0.0
light angle	1.7	2.0	1.67	1.0	1.67	1.67
	1.1	1.22	1.38	1.8	1.13	1.67
cloud cover	3.9	4.67	3.63	2.2	4.0	3.33
	2.9	2.78	2.75	3.6	2.25	3.67
wildness	5.8	6.0	3.92	3.4	4.5	3.0
	2.8	2.67	5.38	5.4	5.25	4.67
feature comp.	2.2	1.67	1.42	1.2	1.17	1.0
	1.0	1.0	2.0	2.4	1.63	1.0

Table 9 - Mean values of high and low slide groups as assessed by three predictive systems.

system	*test group*	*experts:*				
		1.	*2.*	*3.*	*4.*	*5.*
Shafer (high)	47.1	65.7	164.7	181.3	165.0	158.9
(low)	180.4	178.4	106.5	80.1	46.2	131.9
Index	5.42	5.71	4.31	3.85	4.56	4.08
	3.60	3.55	5.11	5.59	4.67	4.32
Graphic Analysis	422.6	361.7	118.4	48.0	79.5	96.3
	0.0	3.6	239.8	422.2	153.1	192.7

APPENDIX B

Black-and-white prints of the five highest- and five lowest-rated scenes, arranged in descending rank order.